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The Page Price of Popular Fiction and Nonfiction Books: An Exploratory Study

William C. Robinson

To what degree do the list and per-page prices of popular fiction and nonfiction vary by category, binding, and presence of illustrations? To study this question, two issues of Booklist, *one from 1991 and one from 1992, were used to generate a sample of 343 and 352 items. Two hundred seven publishers were represented. About 5% of the books were starred by* Booklist *as being of unusual value. Between 81% and 87% of the books were cloth editions, and 46% to 50% were illustrated. The mean price for an adult book was $21.95 in 1991 and $20.98 in 1992. Per-page prices were easily calculated. The mean price per page for an adult book was 15 cents in both 1991 and 1992. Between 8% and 10% of the books in each year had per-page prices far beyond the mean. Binding appears to be the best predictor of list and per-page price. Relationships between list price and per-page price and category, binding, illustration, audience, and publisher are discussed.*

The rising cost of materials presents libraries with a considerable challenge (Lynden 1983, 156). The number of traditional items available for selection continues to increase at the same time that new, and often expensive, publication formats are in greater demand. The cliche that we acquire less and less of more and more seems particularly apt today. Selsky (1991, 42) notes that the inflation rate for books continues to increase at a dramatic rate, often exceeding the increase in the Consumer Price Index. Lynden (1983, 156–57) concludes that libraries face a new age of austerity as they compete for ever-scarce resources. Questions about book prices, discounts, and value will assume greater importance in the future.

The price of books has long created tensions between librarians and publishers. Hendrickson (1987, 5) notes that in 1876 the American Library Association passed a resolution against the American Bookseller's Association (booksellers then provided libraries with most of their books) because the ABA then limited libraries to a maximum 20% discount off list price. He concludes that copyright and pricing have been the most frequent sources of discord between libraries and the book trade, with pricing being the

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William C. Robinson is Associate Professor, Graduate School of Library and Information Science, University of Tennessee, Knoxville. The author wishes to acknowledge the assistance of Melissa Brenneman and Kelly Maine, who provided coding and data entry help. The University of Tennessee Computing Center contributed computing support and the Statistical Package for the Social Sciences. Manuscript submitted March 4, 1993; accepted for publication June 19, 1993.

"most enduring irritant." The American Publishers' Association has a long history of attempting to maintain the full retail price of books. Besides setting the list price, the publisher determines discounts, payment and prepayment terms, return policies, and ordering requirements. Each of these decisions, which might seem arbitrary and idiosyncratic, varies from publisher to publisher and has considerable impact on the price that libraries pay for a new book (Schrift 1987, 29).

Price indexes useful for planning future resource allocations to support collection development have been available for several years. A price index for publications purchased by libraries was first proposed in 1966 by William Kurth, then assistant order librarian at the Library of Congress. His proposal resulted in the price indexes for books and serials that we are familiar with today (Lynden 1990, 423). For example, most librarians are familiar with the annual book price study published each spring in *Publishers Weekly*. However, such an index provides only a gross measure of price and change in price. Knowing the mean price of a business book, for example, is helpful but does not answer the more basic question of whether a particular book is a good value. Value is obviously related to the amount and quality of intellectual content, the quality of design and manufacture, and the degree to which a book is likely to be used by and to be useful to a library's users.

Both librarians and reviewers have noted that publishers can inflate the price of a book by manipulating its design and manufacture (Wall 1975, 170–72). Melton (1991, 36) commented that

> it would be nice if publishers wouldn't insult our intelligence with leading tricks, huge margins, extra-big type, blank pages, hiatuses that make a narrative look like a movie script and extra-heavy stock, in order to pass the heft test.

The matter of meager discounts has also drawn comment. Scilken (1992, 6) has frequently remarked that children's books are often available only in short-discount library bindings that are quite expensive. Eaglen (1979, 30–33) has also written about how the use of short discounts substantially increases the price libraries pay for books.

Lynden (1983, 161) notes that "studies on the costs of materials need to be encouraged and then disseminated widely. There is surprisingly little published research on the costs of materials." Scilken (1989, 10) argues that book reviews need to contain more information about price. Specifically, he would like each review to include the price, the likely discount, and the estimated price per page. Scilken (1988, 6) is "truly astounded at the actual cost per page of many of the 'non-picture books' reviewed." It is "ironic," he says, "that librarians who pride themselves on providing information to others are so information poor when it comes to buying books, their most frequent purchase (Scilken 1989, 10)." A recent advertisement by the Birch Lane Press for *Diana: A Princess and Her Troubled Marriage* by Nicholas Davies, under the headline "More Diana for Your Dollar," featured a per-page cost of 6 cents versus 14 cents for the competing *Diana: Her True Story* ("More Diana for Your Dollar," 1992). This publisher hoped to convince book buyers that price per page was a good indicator of value.

While knowing the price per page, per word, or per character might help one recognize works with prices that seem unreasonable, it must be acknowledged that, ultimately, there can be no competition between books. Each is unique, and copyright represents recognition of that uniqueness. In essence, the publisher is a monopoly producer, and no one else may compete by issuing the same work (Levant 1974, 320–21). However, the price per page still has some utility. Levant (1974, 328) says it well:

> Unit manufacturing costs vary so markedly with the size of the book, the print run, and the complexity of the composition, that the per-page standard can serve only as a very rough measure of pricing policy and practice. For an individual title it can be useful to see how it computes on a price per page basis with comparable books of equal specialization of about the same size. Such a comparison is useful if it reveals disparities in prices.

Like the unit price information found

on the shelf in the grocery store, per-page prices alert the buyer to good value—other things being equal. Inclusion of per-page information "on the shelves" of *Booklist* or other selection periodicals should also alert buyers to good value.

The purpose of this exploratory study is to identify the per-page price of a small sample of popular fiction and nonfiction books reviewed by *Booklist*. Questions of interest include: How easy would it be to include page price data in reviews? How informative would it be? While this exploratory study is primarily descriptive, some relationships will be explored, including the degree to which page costs vary by subject, by edition (paper versus cloth), by the inclusion of illustrations, by publisher, and by year.

LITERATURE REVIEW

The single best compilation of information on pricing is by Fran Spigai (1991). She does quite a good job of summarizing literature on the pricing of scholarly books, but has little to say about nonscholarly book publishing in the United States. No earlier statistical analyses of book prices were found that included per-page price. Most of the literature on book prices is descriptive, anecdotal, or sometimes even polemic. Staff from some scholarly publishers have written several interesting and helpful articles on how the price of a book is established (Bohne 1976; Levant 1974; Bowker 1977). There are also technical articles on the use of formulas to set book prices (Day 1983).

However, page price analyses are found in studies of periodical pricing (Petersen 1989). Variables frequently encountered in these studies to explain price include year of publication; number of pages; inclusion of photographs, art, or graphs; inclusion of advertising; ranking; place of publication; and whether published by a for-profit publisher. Periodical prices increase as the number of pages increases (Petersen 1992, 179). The presence of photos or art is positively correlated with higher prices (Petersen 1992, 180). One of the objectives of these studies is to identify titles whose price is significantly higher than those of similar titles. Petersen (1992, 180) argues that these high-price publishers should be asked to justify their pricing practices. The same, of course, should be true of book publishers.

Some authors have gone beyond page price to investigate the price in cents per thousand characters. The American Mathematical Society began such a study in 1982 (Moline 1989, 12–18). Prices per character and per word might be better measures of content quantity because they would compensate for pages with considerable white space or set with larger-than-normal characters.

METHOD

Of the literature studying journal prices, the article that was most useful for methodological considerations was Moline's 1989 study of the "influence of subject, publisher type, and quantity published on journal prices." This was particularly helpful in considering prices per character and per word.

Booklist was selected as the source of the data for the popular fiction and nonfiction books used here because it is so widely used to develop collections and because it reviews only "recommended" books. The July 1991 and July 1992 issues were selected, and all books with a list price of less than $100 were included in the study. Each book was coded for several variables: year, price, publisher, *Booklist* category, whether the book was starred, number of pages, edition, whether illustrated, and *Dewey Decimal Classification* (DDC) three-digit number.

An attempt was then made to locate for examination each of these books in a local library. For those titles, sample pages were randomly selected, and the number of characters per sample line and the number of lines per page were recorded. The number of words per page was calculated using two methods. First, the actual number of words on a line was counted, with a word defined as one or more characters with white space on each side. Second, a convention was used such that every five or seven characters equaled one word. This latter method has been used in some studies of scientific and technical periodical pricing. The Statistical Package for the Social Sciences (SPSS) was used to generate descriptive statistics, including the price per page, price per word, and price per character, and also to test the relationship between variables using analysis of variance (ANOVA). Cross-tabulation was later applied after price data had been recoded into low, medium, and high values.

RESULTS

SAMPLE CHARACTERIZATION

All of the entries in the July 1991 and July 1992 issues of *Booklist* were used except for those items with a price of $100 or more. There were 343 items from 1991 and 352 items from 1992. About 5% (17) of the 1991 books and 4% (10) of the 1992 books were starred as outstanding of their type.

Of the 31 *Booklist* categories, general fiction (34 in 1991 and 36 in 1992), fiction for young children (34 and 24), children's series (32 and 27), social science (27 and 30), and reference (21 and 21) had the most items.

Two hundred seven publishers were represented in these two issues, with 55 publishers appearing in both issues, 123 in 1991 only, and 138 in 1992 only. Sixty-eight publishers had but one book reviewed in 1991 and 69 in 1992. Five publishers had more than 10 items reviewed in the 1991 issue: Morrow, St. Martin's, HarperCollins, Viking, and Watts. Watts had the most titles reviewed in the issue, with 22 or 6.4%. Six publishers had 10 or more books reviewed in the 1992 issue: Simon & Schuster, St. Martin's, HarperCollins, Abrams, Viking, and Neal-Schuman. Information on publisher size, measured by the number of titles issued in the last year, was found for 212 publishers. The mean 1991 publisher issued 179 titles per year; this figure grew to 263 in 1992. The median was 100 in 1991 and 120 in 1992, while the standard deviation increased from 184 to 317 in 1992.

The relationship between price and profit-making status was investigated. However, it was difficult to determine which of the smaller, less visible publishers were nonprofit. The 13 university presses represented in the sample were obvious nonprofit publishers, and four others were identified—the Sierra Club, American Library Association, Consumer Reports, and the Catholic Library Association. The university presses represented about 6% of the publishers. When all cases were classifed as for-profit or not-for-profit, no significant relationships were found between page price and profit status of the publisher. For cloth, illustrated books, the significance was .10, indicating that a larger sample might yield a statistically significant relationship. About 14% of the university press-published books were in the lowest third of the page price values in contrast to barely 6% for the for-profit publishers. Relationships for cloth books without illustrations or paper books were far from significant.

The overwhelming majority of the books sampled were issued in cloth editions—87% in 1991 and 81% in 1992. About 50% of the 1991 books were illustrated versus 46% of the 1992 books. About 34% of adult books were illustrated in 1991 versus 27% in 1992. Nearly 79% in 1991 and 78% in 1992 of the adult illustrated books were in cloth editions. About 81% of adult books without illustrations were in cloth (79% in 1992). Nearly 79% of all juvenile editions were illustrated versus 85% in 1992. All of these were cloth editions in 1991 and 86% were in 1992.

In 1991, the number of pages in the books reviewed varied from 24 to 1,568. In 1992, the number of pages ranged from 18 to 2,500. The mean number of pages was 219 in 1991 (225 in 1992), with a median of 206 (192 in 1992) and a standard deviation of 164 (214 in 1992). Information about lines, words, and characters was found for the 83 1991 books that could be examined locally. Because only 8 of the 1992 books could be obtained for examination, the information for that year is not considered. Because of the small sample, many categories were represented by only 2 to 4 books; thus generalizations are somewhat suspect. The typical 1991 book contained 34 lines of text per page, with a standard deviation of 12 lines. The same book contained 11 words per line, with a standard deviation of 3 words. With a mean of 386 (median of 388 and standard deviation of 90) words per page, the 1991 book included about 131,384 words (median of 109,230) and a standard deviation of 94,418. The average 1991 book had 1,793 characters per page.

In 1991, the price of books reviewed varied from $2.95 to $75.00 (recall that books with a price of $100.00 or more were excluded from the study). In 1992, the prices varied from $2.99 to $95.00. The most frequently found prices (modes) were $14.95 and $19.95 in 1991 and $19.95 in 1992. The 1991 mean price was $19.02 ($21.07 in 1992), with a median price of $17.95 (in 1992 as well) and a standard deviation of $9.18 ($13.47 in 1992). The mean price of adult books was $21.95 in 1991 and $20.98 in 1992. The mean price of juvenile books was $13.78 in 1991 and $13.89 in 1992.

Twenty-two (6.4%) of the 343 1991 titles gave the selector a choice between paper and cloth editions. The price differential ranged from $6.00 to $35.00, with a mean of $10.68 and a median of $8.00. In 1992, 15 (2.4%) of 352 titles were available in cloth or paper editions, with a price differential range from $5.00 to $20.05. The mean difference between editions was $11.18, with a median of $10.05.

Twenty 1991 juvenile titles were available in a regular and a library edition. Ten titles were less expensive in the library binding, usually by 6 or 7 cents, and 10 were more expensive in the library binding, usually 4 cents more. In 1992, 15 titles were available in the two cloth editions. Four titles were more expensive, all by 99 cents, while 11 titles were less expensive, usually by 7 or 11 cents. If the discount schedule is ignored, the price of these two editions is virtually identical.

The mean 1991 and 1992 page price was 15 cents, with medians of 10 cents and standard deviations of 13 cents. The price of 1,000 words in a 1991 book was 21.2 cents (median of 18.3), with a standard deviation of 12 cents. Word price information for 1992 books was not available because of difficulty in securing examination copies of these books. The median price for 1,000 characters was 5.5 cents, with two-thirds of the books having a mean price of 7 cents or less. A few high values skewed the mean dramatically. Character price was significantly associated with the word (.01 with Pearson correlation coefficient $R = .99$) and page (.000 with $R = .54$) prices. Word price was significantly related to page price in 1991 (.000 with $R = .63$) and to price (.000 with $R = .31$). The number of pages was significant and substantially related to the number of words (.000 with $R = .95$). This suggests that there is little need to count words and that page price is an adequate substitute for the more-difficult-to-calculate word price. Words were counted both as five- and seven-character strings and as a unit with white space on each side. The five- and seven-character-string words were significantly related to the regular words (.000 with $R = .90$). The number of five- and seven-character words was also significantly related, with an R of nearly 1.00. Thus, there seems to be little need to count characters for those interested in price per word.

MEAN DOLLAR PRICE

Because page price often reflects book price, it might be useful to begin with the mean dollar price. List price is provided in the bibliographic citation for virtually all of the works reviewed. Table 1 is a list of the mean price for each of the several *Booklist* categories in 1991. Reference, craft, professional, arts, literature, and gardening books tend to be the most expensive in cloth editions. Mean price differences by edition and presence of illustrations may be seen. Table 2 is a list of the mean price for each of these categories in 1992. Reference, arts, gardening, science, and poetry books were most expensive in cloth editions for this year.

Booklist stars books judged to be outstanding within their type. No relationship was found between the list or page price of a work and whether or not a book was starred. We pay no more or no less, then, for books judged "outstanding" by *Booklist.*

The mean price per page is easily calculated by dividing the list price by the

TABLE 1

1991 MEAN DOLLAR PRICE BY CATEGORY, EDITION, AND ILLUSTRATION

Category (*N*)	Cloth	Paper	Illustrated	Not Illustrated
Adult nonfiction upfront (10)	21.98		21.71	22.15
Adult fiction upfront (15)	20.31			20.31
Adult nonfiction general (2)	24.95			24.95
Philosphy and psychology (1)	20.00			20.00
Social Science (27)	23.03	10.88	25.09 c	22.00 c 10.88 p
Language (1)		14.95		14.95
Science (4)	25.50	14.00	25.50 c	14.00 p
Technology (12)	22.29	9.30	20.30 c 7.47 p	23.29 c 12.95 p
Health (9)	24.95	11.35	38.95 c 11.35 p	20.28 c
Gardening (5)	26.63	12.44	26.63 c 12.44 p	
Cookery (8)	21.80	8.96	22.95 c 8.71 p	21.22 c 9.95 p
Arts (9)	27.78	24.95	27.78 c 24.95 p	
Crafts (3)	37.47	14.95	37.47 c 14.95 c	
Recreation and sports (5)	20.20	10.95	21.45 c 10.95 p	18.95 c
Literature (5)	26.76		30.30 c	21.45 c
Poetry (2)		10.45		10.45 p
Geography and travel (4)	25.45		25.95 c	24.95 c
History (15)	23.84		26.41 c	21.58 c
General fiction (34)	19.75	8.76	12.95 p	19.75 c 7.71 p
Mystery (12)	19.07	3.99		19.07 c 3.99 p
Science fiction (5)	19.65	5.00		19.65 c 5.00 p
Older child nonfiction (8)	15.63		15.77 c	15.55 c
Older child fiction (13)	14.87	9.45		14.87 c 9.45 p
Middle child nonfiction (23)	13.53		13.52	13.95
Middle child fiction (9)	13.73		13.62	13.79
Young child nonfiction (4)	12.45		12.45	
Young child fiction (34)	13.26		13.26	
Children's series (32)	14.12		14.00	17.95
Professional (11)	30.58	15.30	31.00 c 9.75 p	30.49 c 19.00 p
Reference (21)	39.98	20.13	37.23	43.42 c 20.13 p
Religious (0)				

TABLE 2

1992 MEAN DOLLAR PRICE BY CATEGORY, EDITION, AND ILLUSTRATION

Category (*N*)	Cloth	Paper	Illustrated	Not Illustrated
Adult nonfiction upfront (10)	22.33		21.99	22.85
Adult fiction upfront (11)	21.30			21.30
Adult nonfiction general (0)				
Philosphy and psychology (4)	21.71			21.71
Social Science (30)	22.26	15.74 p	25.23 c	20.43 c 14.54 p
Language (0)				
Science (2)	45.98		69.95 c	22.00 c
Technology (8)	20.82	11.98	21.65 c 12.95 p	19.98 c 11.00 p
Health (6)	23.95	13.95	20.95 c 12.95 p	22.95 c 14.95 p
Gardening (2)	45.98		45.98 c	
Cookery (4)	19.24		19.24 c	
Arts (11)	48.84	14.48	67.49 c 24.95 p	23.98 c 14.48 p
Crafts (3)	24.62		24.62 c	
Recreation and sports (2)	18.95			18.95 c
Literature (8)	25.48	10.23	12.95 p	25.48 c 7.50 p
Poetry (2)	29.95	18.95	18.95 p	29.95 c
Geography and travel (1)	19.95			19.95 c
History (11)	25.98	10.00	27.48 c	10.00 p
General fiction (36)	20.29	6.33		20.29 c 6.33 p
Mystery (22)	18.52	3.95		18.52 c 3.95 p
Science fiction (9)	21.51	5.49	20.90 c	21.62 c 5.49 p
Older child nonfiction (15)	15.46	11.70	15.28 c 11.70 p	15.95 c
Older child fiction (8)	13.85	3.99	15.00	13.39 c 3.99 p
Middle child nonfiction (16)	14.84	7.95	14.90 c	13.95 c 7.95 p
Middle child fiction (15)	13.37	3.25	12.84 c 2.99 p	13.98 c 3.50 p
Young child nonfiction (11)	14.21		14.21	
Young child fiction (24)	14.28		14.28	
Children's series (27)	13.66	12.95	13.66 c 12.95 p	
Professional (29)	25.92	27.48	24.98 c 25.60 p	26.46 c 28.01 p
Reference (21)	53.69	23.20	55.49 c	53.14 c 29.95 p
Religious (3)	22.33		22.50	22.00

TABLE 3

1991 Mean Dollar Price per Page by Category, Edition, and Illustration

Category (*N*)	Cloth	Paper	Illustrated	Not Illustrated
Adult nonfiction upfront (10)	6.69		7.62	6.07
Adult fiction upfront (15)	7.12			7.12
Adult nonfiction general (2)	8.62			8.62
Philosphy and psychology (1)	11.36			11.36
Social Science (27)	8.50	4.93	10.54 c	7.48 c 4.93 p
Language (1)		4.40		4.40
Science (4)	9.12	4.38	9.12 c	4.38 p
Technology (12)	9.54	4.16	8.72 c 6.75 p	9.96 c 2.86 p
Health (9)	9.41	5.40	8.55 c	11.99 c 5.40 p
Gardening (5)	12.42	9.29	12.42 c 9.29 p	
Cookery (8)	10.04	4.22	15.94 c 4.16 p	7.09 c 4.44 p
Arts (9)	10.13	17.33	10.13 c 17.33 p	
Crafts (3)	21.34	10.38	21.34 c 10.38 p	
Recreation and sports (5)	8.47	5.26	8.78 c 5.26 p	8.15 c
Literature (5)	8.23		6.53	10.78
Poetry (2)		11.75		11.75
Geography and travel (4)	9.65		13.00	6.30
History (15)	7.86		7.79	7.91
General fiction (34)	7.32	4.88	4.56 p	7.32 c 4.96 p
Mystery (12)	6.16	1.66		6.16 c 1.66 p
Science fiction (5)	5.15	1.49		5.15 c 1.49 p
Older child nonfiction (8)	9.83		11.87 c	8.60 c
Older child fiction (13)	7.63	7.24		7.63 c 7.24 p
Middle child nonfiction (23)	28.69		29.65	7.27
Middle child fiction (9)	11.52		14.39	10.08
Young child nonfiction (4)	32.66		32.66	
Young child fiction (34)	40.69		40.69	
Children's series (32)	25.29		25.66 c	14.02
Professional (11)	11.71	11.16	4.04 c 8.55 p	13.25 c 12.90 p
Reference (21)	15.40	8.4	14.09 c 8.40 p	17.03 c
Religious (0)				

TABLE 4

1992 MEAN DOLLAR PRICE PER PAGE BY CATEGORY, EDITION, AND ILLUSTRATION

Category (*N*)	Cloth	Paper	Illustrated	Not Illustrated
Adult nonfiction upfront (10)	6.61		7.27	5.62
Adult fiction upfront (11)	5.73			5.73
Adult nonfiction general (0)				
Philosphy and psychology (4)	7.94			7.94
Social Science (30)	8.32	8.08	8.77 c 8.88 p	8.04 c 7.86 p
Language (0)				
Science (2)	14.94		23.01	6.88
Technology (8)	7.55	6.65	7.06 c 8.52 p	8.03 c 4.78 p
Health (6)	9.95	6.30	7.30 c 7.71 p	17.91 c 4.89 p
Gardening (2)	10.60		10.60	
Cookery (4)	12.43		12.43	
Arts (11)	17.92	9.17	25.42 c	7.91 c 9.17 p
Crafts (3)	16.33		16.33	
Recreation and sports (2)	12.50			12.50
Literature (8)	6.93	6.39	6.08 p	6.93 c 6.70 p
Poetry (2)	6.31	6.97	6.97 p	6.31 c
Geography and travel (1)	6.08			6.08
History (11)	8.84	4.17	11.17 c	7.30 c 4.17 p
General fiction (36)	8.04	1.94		8.04 c 1.94 p
Mystery (22)	6.78	2.06		6.78 c 2.06 p
Science fiction (9)	5.69	1.67	6.76 c	5.52 c 1.67 p
Older child nonfiction (13)	13.65	6.93	14.83 c 6.93 p	9.51 c
Older child fiction (6)	9.83	2.02		9.83 c 2.02 p
Middle child nonfiction (15)	21.50	2.88	22.31 c	10.90 c 2.88 p
Middle child fiction (14)	14.14	3.35	18.65 c 3.74 p	9.62 c 2.97 p
Young child nonfiction (7)	38.40		38.40	
Young child fiction (24)	43.78		43.78	
Children's series (27)	26.10	7.04	26.10 c 7.04 p	
Professional (29)	13.57	17.27	14.72 c 20.16 p	12.91 c 16.44 p
Reference (20)	10.68	7.01	11.12 c 7.01 p	10.54 c
Religious (3)	8.66		8.53	8.94

number of pages. Table 3 is a list of the 1991 mean dollar price per page for each *Booklist* category. Fiction for young children, nonfiction for young children, nonfiction for middle-aged children, and crafts books were most expensive in 1991. Table 4 is a list of the 1992 mean dollar price for the same categories. With the substitution of "arts" for "crafts," the 1992 list of most expensive categories is the same. A work of nonfiction for a young child has a price almost six times as high as a work of nonfiction for an adult.

The mean price is useful in giving the selector some sense of how expensive a work is in comparison to its peers. Standard deviation is useful in indicating how much prices for a category vary. Categories with large standard deviation values vary quite a bit, while those with small standard deviation values tend not to vary much from the mean. 1991 and 1992 standard deviations of mean price by category are presented in table 5. The reference, literature, craft, arts, and professional categories had the greatest variation in price in 1991. The science, arts, gardening, reference, and professional categories had the greatest price variation in 1992. In table 6, the standard deviation of mean page price by category for 1991 and 1992 is presented. Nonfiction for young children, series books for children, nonfiction for middle-aged children, fiction for young children, and reference books had the greatest price variation in 1991. In 1992, nonfiction for young children, series books for children, nonfiction for middle-aged children, science books, and arts books had the greatest range of prices.

TABLE 5

STANDARD DEVIATION OF MEAN DOLLAR PRICE BY CATEGORY

Category	1991	1992
Reference	17.17	21.78
Literature	13.35	8.65
Crafts	13.23	9.23
Arts	12.76	27.76
Professional	11.58	9.67
Health	9.32	7.31
Technology	9.13	6.44
Gardening	8.23	26.90
Science fiction	8.04	7.56
Adult nonfiction gemeral	7.07	—
Cookery	6.89	5.29
Science	6.42	33.90
Geography	6.40	—
Social science	6.12	8.21
History	5.57	6.87
Mystery	4.52	3.87
General fiction	4.52	4.69
Recreation	4.44	—
Young child nonfiction	4.10	2.29
Series books for children	2.92	2.12
Older child nonfiction	2.52	2.97
Young child fiction	2.51	1.18
Adult nonfiction upfront	2.15	3.32
Older child fiction	2.14	4.03
Middle child nonfiction	1.99	2.39
Adult fiction upfront	1.67	2.36
Middle child fiction	1.39	3.80
Religious	—	.57

SELECTOR UTILITY

If page price information were included in the bibliographic citation, it might look like this:

> Vonnegut, Kurt. ***Fates Worse Than Death: An Autobiographical Collage of the 1980s.*** Sept. 1991. 240p. illus. Putnam, $22.95 *[9.6¢]* (0-399-13633-9). Galley. 813".54 [B] Vonnegut, Kurt—Biography Novelists, American—20th century—Biography [CIP] 91-10691.

Because the page price is easily calculated, it would not be a burden for the reviewer to include it. It is unlikely, however, that means or standard deviations for categories would be compiled and made available by the reviewing source because of the time and effort involved.

TABLE 6

STANDARD DEVIATION OF MEAN PAGE COST BY CATEGORY

Category	1991 Mean (Cents Per Page)	1992 Mean (Cents Per Page)
Young children nonfiction	12.3	14.8
Series books for children	11.2	11.8
Middle children nonfiction	10.8	11.5
Young children fiction	9.5	5.2
Reference books	7.3	4.5
Geography & travel	7.0	—
Crafts	6.4	7.9
Professional	5.2	7.1
Poetry	4.9	0.5
Arts	4.5	10.0
Gardening	4.4	8.0
Cookery	4.1	7.2
Middle children fiction	3.9	7.9
Literature	3.8	2.2
Technology	3.6	1.9
Adult nonfiction general	3.4	—
Science	3.4	11.4
Older children nonfiction	3.2	4.8
Social science	2.9	4.3
General fiction	2.8	2.8
Health	2.8	4.8
Adult fiction upfront	2.6	1.7
History	2.5	4.4
Adult nonfiction upfront	2.4	2.5
Science fiction	2.1	1.9
Recreation & sports	1.9	0.9
Mystery	1.6	1.5
Older children fiction	1.4	3.8

However, the selector would certainly notice that some page prices are much higher than others. In 1991, 33 books (about 10%) had a page price high enough to prompt some reflection on the part of the reader. In 1992, 29 of 252 books (about 8%) would likely warrant a second look based on high per-page price. Bookwright was the only publisher to have more than one title on the 1991 list. It also had four similar titles on the 1992 list. At this preliminary stage of investigation, there does not appear to be any other publisher with per-page prices consistently higher than the mean. Upon examination, most adult books with high page prices are characterized by many color illustrations. They are also likely to be issued by smaller, more specialized, and less visible publishers. For example, of the 1991 high page-price books, only 7 were issued by a major trade publisher. In general, most of these books seemed to be reasonably priced after reflecting on review cues such as "lavish" and "100 gorgeous photos." Still, rereading some reviews provided no rationale or explanation to justify the higher price.

For example, in the 1991 issue, "adult nonfiction upfront" titles generally range from 4 to 7 cents per page. Vonnegut's title, mentioned above, at nearly 10 cents per page, is considerably more expensive than its colleagues but would probably be selected anyway because of the prominence of the author. However, the same 10-cents-per-page price for *Silverado: Neil Bush and the Savings and Loan Scandal* might influence the selector to avoid this more ephemeral title. In the adult fiction upfront category, Martin Amis' *Time's Arrow* at 13 cents per page is nearly twice as expensive as the other items in this category.

It is not likely that an item would be rejected on the basis of high page price alone. An important subject, a unique work, a well-respected author or publisher, or the presence of many color illustrations, for example, might quickly deflect any complaint about a relatively high page price. The fact that the popular and heavily illustrated Reader's Digest book *How Science Works* has a price of 12.5 cents per page, while other works in the cloth, illustrated science category average 8 cents, seems acceptable. However, is Tony Ross's *Don't Do That!* of sufficient value to warrant paying 52.4 cents per page when other

1991 works of fiction for younger children average 40.7 cents? The case might be easier to make with series books because some selectors are suspicious of them to begin with. The *Wildlife at Risk* series by Bookwright listed in the 1992 issue of *Booklist* includes titles on monkeys, seals and sea lions, turtles and tortoises, and wolves—books that average 37.2 cents per page when the series book mean is 19.7 cents per page. This price differential would probably encourage the selector to take a close look or to defer the selection decision until more information became available.

The page price variable stimulates questions that the typical bibliographic citation does not answer. For example, *Booklist* simply tells us that the work is illustrated. It does not tell us how many illustrations are in black and white or how many are in color. The body of the review might comment on the quality and utility of the illustrations. Still, lack of information about special features that might explain a high page price clouds decision making.

RELATIONSHIPS

Given the visible variation in pricing of both the book and the page, price variables were compared to the independent variables available to see whether price variation could be explained. Price was significantly related to the number of pages (.000 with R = .48) so that high-priced books are likely to have more pages. Price was not significantly related to publisher size as measured by the number of titles issued in the last year reported in *Publisher's Directory* or *Literary Market Place*. For example, books issued by large publishers were no more expensive than those issued by small publishers and vice versa.

Binding also had quite an impact on price. Cloth books are significantly more expensive when we control for illustration. For example, cloth books without illustrations are substantially more expensive than paper books that are not illustrated (.000 with V = .58). (V refers to Cramer's V, which measures the strength of the relationship between two variables, with 0 indicating no relationship and 1.00 indicating a perfect relationship.) The presence of illustrations had less impact on price. Among cloth editions, illustrations are associated with a higher price (at .000 with V = .40). However, price was not related to illustration in paper editions. This means that binding was a somewhat better predictor of high price than illustration, especially in 1991.

When we control for edition and audience, we find a significant relationship between page price and illustration for adult cloth books in 1991 and 1992 (.000 with V = .27 and .41). Illustrated books are much more likely to have a high page price, although 92% of the adult illustrated, cloth books were of low or medium price. When controlling for juvenile cloth books, page price is more related to illustration (.000 with V = .68 and .59 for 1992).

Page price was significantly related to category (.000 with R = .52 in 1991 and R = .40 in 1992). This is even more the case when we control for edition and illustration. Among cloth, illustrated 1991 and 1992 editions, page price was significantly (.000 with V =.70 and .63 in 1992) related to category. This means that books in some categories, other things being equal, are likely to be more expensive. When page price was recoded into "low," "medium," and "high" values, five 1991 categories were identified as being of high price: fiction for young children, nonfiction for young children, nonfiction for middle-aged children, series books for children, and craft books. Virtually the same findings were found for 1992 except that arts books replaced craft books. Interestingly, only 20% of the reference books had a high page price. The categories most likely to be illustrated, in cloth editions, and with a page price in the lower third are (both in 1991 and 1992): adult nonfiction upfront; literature; and professional reading.

Page price was also related to *DDC* class for nonfiction works. No significant relationships were found between page price and *DDC* 100 classes for adult books. Controlling for juvenile illustrated books, page price was significantly related to *DDC* class (.006 with V = .45 in 1991 and .55 in 1992). Books were more likely to be

TABLE 7

RANKED PRICES FOR 1991 CLOTH, ILLUSTRATED BOOKS*

Price per 1,000 Characters	Price per Word	Price per Page	List Price
Young child fiction	Young child fiction	Young child fiction	Crafts
Middle child nonfiction	Middle child nonfiction	Middle child nonfiction	Reference
Middle child fiction	Children's series	Children's series	Arts
Children's series	Middle child fiction	Crafts	Gardening
Reference	Crafts	Middle child fiction	Science
Crafts	Arts	Reference	Social science
Arts	Reference	Gardening	Nonfiction upfront
Technology	Technology	Social science	Recreation
Nonfiction upfront	Nonfiction upfront	Arts	Technology
Recreation	Social science	Science	Children's series
Gardening	Recreation	Recreation	Middle child fiction
Science	Gardening	Technology	Middle child nonfiction
Social science	Science	Nonfiction upfront	Young child fiction

*Prices are arranged in descending order with the highest prices listed first.
N = 83 for the character and word prices and 343 for the page and list prices.

TABLE 8

RANKED PRICES FOR 1991 CLOTH BOOKS WITHOUT ILLUSTRATIONS

Price per 100 Characters	Price per Word	Price per Page	List Price
Older child fiction	Older child fiction	Professional	Professional
Professional	Professional	Health	General nonfiction
Middle child fiction	Literature	Poetry	Geography travel
Science fiction	Health	Philosophy psychology	Technology
Literature	Middle child fiction	Literature	Social science
Poetry	Technology	Middle child fiction	History
Older child nonfiction	Older child nonfiction	Technology	Literature
Health	Poetry	General nonfiction	Upfront fiction
Philosophy psychology	Philosophy psychology	Older child nonfiction	Health
General fiction	Upfront fiction	History	Philosophy psychology
Geography travel	Social science	Older child fiction	General fiction
Technology	General fiction	Social science	Science fiction
General nonfiction	General nonfiction	General fiction	Mysteries
Upfront fiction	Geography travel	Upfront fiction	Older child nonfiction
Social science	History	Geography travel	Older child fiction
History	Mysteries	Mysteries	Middle child nonfiction
Mysteries	Science fiction	Science fiction	Poetry

high priced in the 500s and 300s in 1991 and in the 300s in 1992.

All 31 categories were recoded into adult and juvenile. In 1991, the mean page price of an adult book was 8.6 cents, with a standard deviation of 4.6 cents. In 1992, the mean page price of an adult book was 9.3 cents, with a standard deviation of 5.6 cents. Adult cloth, illustrated books had a price of 10.6 (11.7 cents in 1992) cents per page while adult paper, illustrated books had a price of 7.6 (11.1 cents in 1992) cents per page. Adult cloth books without illustration had a price of 8.3 cents per page (8 cents in 1992) and paper ones had a price of 5.8 cents (10 cents in 1992). Thus, illustrations appear to add about four cents to the page price of an adult cloth book and 2.5 cents to an adult paper one.

The mean price of a juvenile book was 26.5 cents per page (24.5 cents in 1992). Cloth, illustrated juvenile books had a price of 31.4 cents per page (30.9 cents in 1992), while cloth, non-illustrated juvenile books were 8.7 cents per page (8.6 cents in 1992). Paper juvenile books without illustration were almost the same price as the cloth editions in 1991 (7.2 cents) but not in 1992 (2.6 cents). Illustrations add about 23 cents per page to the price of a cloth children's book.

For adult cloth books without illustrations, the finding was quite similar for both 1991 and 1992 (at .00 with $V = .55$). Only reference and cookery books had any items in the high page price category in 1991, and there were no high-price items in 1992 for this type of book. The least expensive 1991 cloth books without illustration were science fiction, mystery, and adult nonfiction upfront. In 1992, geography and travel, poetry, adult fiction, and adult nonfiction upfront were least expensive.

Page price is also a function of the number of pages (.000 with $R = -.66$ in 1991 and -.52 in 1992), so that page price decreases as the number of pages increases.

CONCLUSIONS

In studies of periodical pricing, concerns about white space, type size, and the like have encouraged the investigation of price per word and character. One of the questions answered above is the degree to which these different price measures are similar. Another approach would be to use Spearman correlation coefficients to measure the degree to which high values for one price variable, for example, are related to high values for another price variable. When this was done, character price, word price, and page price were significantly and strongly related at the .001 level, with correlation coefficients between .82 and .89. However, only page price was significantly related to list price (.001 with $R = -.12$). Ranked character, word, page, and list prices for cloth illustrated 1991 books for those categories where all these prices were available are found in table 7. Note that the variables shown in this table and table 8 are based on two different samples, with the character and word prices based on samples of 83 cases while the page and list prices are based on a sample size of 343 cases. Here the Spearman correlation coefficients for character, word, and page price were significant (.002) and substantial (R from .76 to .93). For these cloth illustrated books, list price was not significantly related to character, word, or page cost. Table 8 is focused on cloth books without illustrations. The Spearman correlations were not as strong here (R varies from .47 to .75) but were significant (.035). Based on these rankings it seems reasonable to conclude that use of page price is a quite reasonable substitute for character and word prices. The fact that there is no significant, strong relationship between list price and the other price measures supports the notion that list price is not an adequate measure of value. Because identifying character and word price information would involve considerable extra effort by the reviewer, as well as introducing serious sampling problems, these findings strengthen the case for inclusion of page price information in review media.

The fact that only about 10% of the books reviewed, based on this exploratory study, will have page prices that warrant a second, more reasoned look can be interpreted variously. One interpretation would be that if 90% of the books reviewed have page prices that are reasonably close to their category mean, there is really no need to add this information to the bibliographic citation. Another interpretation would be that even such a small percentage would warrant the effort, especially because it requires so little time and effort. Too, the price per page information is likely to encourage librarians to be more value-oriented in their collection development.

Most librarians assume that the price of a book is related to binding and illustration. Findings reported above supported these assumptions. However, it was interesting to note that binding—cloth or paper—was a much better predictor of high price than illustration. Given the similarities, especially because so many cloth books now receive an adhesive binding, between the cloth and trade paper editions, the cost differential seems unjustified.

While no librarian would advocate moving collection development monies from young child fiction to social science books for adults because the latter is less expensive by the character, word, and page, the fact that some categories are considerably more expensive than others might encourage more careful selection by category. For example, series books for children and juvenile nonfiction in the 300s and 500s might warrant a second look. The same is true for adult books in the arts and crafts.

We will never really know exactly why the price of book A is higher or lower than that of book B. It is also difficult to know whether the mean price is a reasonable one or represents good value. Value, rather than price, is what is most important. A book might have a high list price and or a high page price and still be an excellent value because of the book's quality, utility, and likely heavy use, and special features. The inclusion of page price data in reviews would encourage librarians and publishers to consider more fully the relationship between price and special features within a category. Certainly, the page price is more informative than the list price and might encourage librarians to focus on value as well as price.

The wide variety of publishers—trade, university, specialty, small, and large—represented in this small sample was encouraging. Clearly, a few large trade publishers do not dominate the publishing of books likely to end up on library shelves. It seems unlikely, then, that there will be some sort of oligopoly in which a few large, multinational publishers dominate the market and determine what is available and set prices.

Although there were some measurement difficulties that might diminish the finding, no significant relationship between profit-making status and page price was found in this sample. This is certainly different from periodical page price studies, in which Petersen (1989, 1–9) found journals from for-profit publishers to be significantly more expensive.

With more than 80% of these books issued in cloth editions, selecting a paper edition is not an effective alternative to high prices. If these *Booklist* issues are typical, only 4% to 6% of the items reviewed are available in both paper and cloth editions. However, if the paper edition were selected, the library would save about $11.18 per title before binding expenses.

Over the years, considerable controversy has erupted over the value of library editions of juvenile books, especially over their short discount schedule. Only a few juvenile books are issued in both a trade and a library edition—16% in 1991 and 13% in 1992. Because about 85% of these juvenile titles are issued in but one edition, the issues related to the short discount schedule and the durability of the library binding might not be as important as they seem.

In considering the utility of page price information, note the difference between a ranking by list price and one by page price. All but one of the most expensive books, by page price, are juveniles. The only adult books that have high per-page prices are craft books in 1991 and arts books in 1992. Craft and arts books were the only categories to appear in the most expensive list by price ranking and the most expensive page price ranking. Thus, page prices remind us that juvenile books are, relatively, much more expensive than adult books.

Standard deviation of list prices is a good measure of the degree to which prices for adult books vary from the mean. In both 1991 and 1992, reference, arts, and professional books had great variation in pricing. Given the substantial difference in pricing, selectors might wish to exercise more care with these categories.

Considerable variation in standard deviation of page prices is most likely to be seen in juvenile fiction and nonfiction along with reference books. Again, the great range of prices might indicate opportunities for unusual value as well as some items that may be overpriced.

SUGGESTIONS FOR FURTHER RESEARCH

Given the small number of books studied here, it would be helpful to replicate the study with a larger sample. Not only would more cases be of value, but it would be interesting to include reviews from sources that publish negative and mixed as well as positive reviews. It would also be of interest to see how page prices have changed over time.

Because we know relatively little about how librarians react to the price of materials, survey research investigating the role that price plays in selection decisions and how that role changes with category, audience, or format would be valuable. For example, how many librarians have price ceilings so that they automatically exclude from selection consideration books that cost more than a certain amount? When do librarians select a paper rather than a cloth edition or a library rather than a trade edition? The relationship between price and value might be explored as well.

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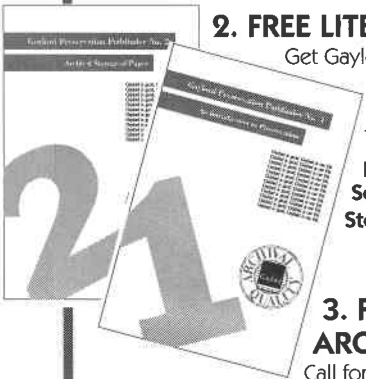

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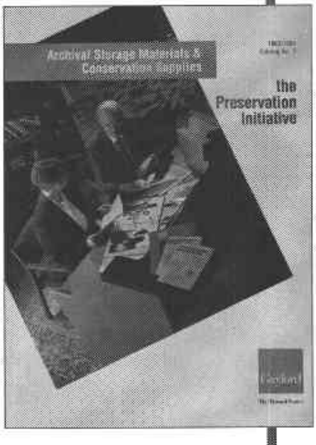
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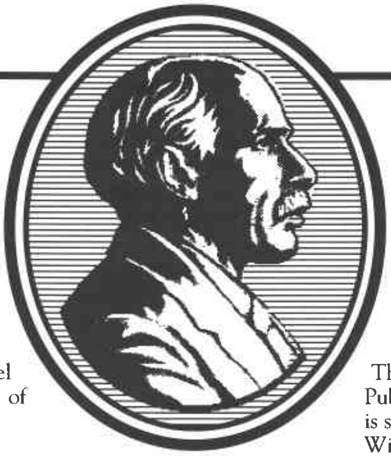

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The Hidden Classification in Library of Congress Subject Headings for Judaica

Bella Hass Weinberg

The syndetic structure of subject heading lists, in particular the broader/narrower term references, constitutes a hidden classification that may be converted to an explicit tree structure. Such a structure may be used to examine the hierarchy of LC subject headings (LCSH) and to compare them with that of Library of Congress Classification (LCC). Joseph Galron's compilation, Library of Congress Subject Headings in Jewish Studies *(1991), was analyzed for several features relating to the hierarchy of terms, and tree structures were built for the deepest hierarchies:* **Jews, Judaism, Hebrew language**, *and* **Israel**. *These were compared with the corresponding LC classes. A hierarchy in LCSH may have more levels than the corresponding schedule in LCC. It is concluded that the conversion of the broader-term narrower-term references of subject heading lists into tree structures is a useful tool for examining the correctness of a hierarchy. Display of subject headings in tree-structure format can assist users in grasping the hierarchy of subject headings and in navigating online catalogs.*

It has long been recognized by experts on subject analysis that every controlled vocabulary with a rigorous syndetic or cross-reference structure possesses a hidden classification (Lancaster 1972, 16). By tracing the *see also* references from broad to narrow terms, it is possible to construct a hierarchy.

See also references, which *Library of Congress Subject Headings* (*LCSH*) featured through the 10th edition (1986), are of two types: one leads from a broad term to a more specific or narrower term, while the second kind leads to a related term—one that is neither broader nor narrower, but semantically associated with it.

The type of *see also* reference could in theory be identified from its reciprocal, the *xx* reference. Since *LCSH* only provided downward *see also* (*sa*) references, that is,

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from broad to narrow terms, the lack of an *xx* reference for the term in a *see also* reference generally indicated that it was a narrower term. If under a subject heading one found both an *sa* reference and an *xx* tracing, that indicated that the reference was made in both directions and that the two terms are associated. Sinkankas (1972, 53–58) found many counterexamples to the principle of downward *see also* references and concluded that hierarchies could not be constructed from this notation.

In the 11th edition of *Library of Congress Subject Headings* (1988), thesaurus notation appeared. This was controversial and stimulated an article by Mary Dykstra (1988) titled "LC Subject Headings Disguised as a Thesaurus." Dykstra thought that because LC subject headings do not meet the criteria for thesaurus descriptors, LC should not have adopted thesaurus notation. There is no question, however, that such notation clarifies the relationships between headings and lets us know immediately whether the relationships are hierarchical or associative. The conversion of *see also* references to thesaurus notation is illustrated in figure 1.

Zionism

sa Balfour Declaration [narrower term]
Jewish nationalism [related term]

xx Jewish nationalism
Judaism and state [broader term]

Source: LCSH, 10th ed. (1986), Vol. 2, p. 3538.

Zionism

BT Judaism and state [broader term]
RT Jewish nationalism [related term]
NT Balfour Declaration [narrower term]

Source: LCSH, 11th ed. (1988), Vol. III, p. 4158.

Figure 1. *See Also* References vs. Thesaurus Notation.

BT References

Balfour Declaration

BT Zionism

Zionism

BT Judaism and state

Judaism and state

BT Religion and state

Tree Structure

- **Religion and state**
  - **Judaism and state**
    - **Zionism**
      - **Balfour Declaration**

Figure 2. Hierarchy Built from BT/NT References. (Source: *LCSH*, 11th ed., 1988.)

The use of BT/NT (broader term/narrower term) notation yields a thesaurus with what is known as a *flat* format (NISO 1992, 66). The hierarchical information is given only one step at a time. We can follow the trail of BT/NT references and create a complete hierarchical display (see figure 2). There exists software that can convert a flat-format thesaurus into what is called a *generic structure* (NISO 1992, 67) or full hierarchical display.

In the recent library science literature, a lot of attention has been devoted to classified displays in online catalogs. Karen Markey Drabenstott (1990) did the pioneering work with Dewey, and Nancy Williamson (1989) of Canada is working on computerizing the LC classification.

In an article in *Library Resources & Technical Services*, Liu and Svenonius (1991) described an online display of the Dewey classification with an automatically produced chain index. In the introduction to the paper, they tried to draw distinctions between thesauri and classification schemes and stated that in the former, hierarchies are generally flatter, i.e., there

CHILD	**M1.471.392**
CHILD, ABANDONED	**M1.471.392.163**
CHILD, EXCEPTIONAL	**M1.471.392.234**
CHILD, GIFTED	**M1.471.392.234.342**
CHILD, HOSPITALIZED	**M1.471.392.305**
CHILD, INSTITUTIONALIZED	**M1.471.392.377**
CHILD OF IMPAIRED PARENTS	**M1.471.392.400**
CHILD, PRESCHOOL	**M1.471.392.448**
CHILD, UNWANTED	**M1.471.392.465**
INFANT	**M1.471.392.520**
INFANT, NEWBORN	**M1.471.392.520.520**
INFANT, LOW BIRTH WEIGHT	**M1.471.392.520.520.460**
INFANT, SMALL FOR GESTATIONAL AGE	**M1.471.392.520.520.460.560**
INFANT, POSTMATURE	**M1.471.392.520.520.500**
INFANT, PREMATURE	**M1.471.392.520.520.520**
ONLY CHILD	**M1.471.392.750**

Figure 3. Excerpt from *Medical Subject Headings: Tree Structures* (1992).

are very few levels. In a letter published in the subsequent issue, Weinberg (1992) pointed out that this statement is not necessarily true, and the example of *Medical Subject Headings: Tree Structures* (1992) was cited, in which each term is linked to a classification number (see figure 3). As Anderson (1989, 72) has put it, alphabetical "indexing and classification are . . . the same operation"; the only difference is display.

This paper examines the relationship between LC subject headings and classification for Judaica. One area of interest is the redundancy between the two systems for subject access, i.e., the extent to which the identical topics are being represented and grouped by the two systems.

A more important reason for looking at the hidden classification in LC subject headings is to enhance subject searching. Little is currently being done with the syndetic structure of LC subject headings in computerized catalogs. Most online catalogs have phrase searching and keyword searching, i.e., one can search an entire heading or any word in it, but not the relationships between headings.

Although LC's subject authority file is available online, this file is generally consulted only by catalogers. Some vendors of major library management systems offer the capability to transfer cross-references from *LCSH* to online catalogs, but the syndetic structure of *LCSH* is not integrated into many online catalogs. This is analogous to the situation in libraries that place the "red books" (*LCSH*) near the card catalog and neglect to integrate cross-references for headings actually used into the catalog. Few, if any, users consult the "red books" (Anderson 1989, 77).

Broader, narrower, and related term references exist to suggest to the user additional subject headings under which relevant information may be found. A great deal of effort goes into the creation of a syndetic structure, but the rich information contained in it is often underutilized.

Reformatting the BT/NT information into hierarchical displays, or tree structures, would be advantageous to the user, as it would show at a glance the ultimate specific term that is available for a heading. It is easier to grasp the hierarchy from such a display than to follow the BT/NT references one step at a time. It is also easier for catalogers to examine the structure of subject headings for a discipline from a hierarchical display than in the flat format.

There exist a vast number of critiques of LC subject headings in specific domains, but most focus on the correctness of individual terms and relationships. An example of this type of analysis is Wepsiec's "Hierarchical Structure of Subject Headings in the Social Sciences" (1991), which compares the syndetic structure of LC subject headings with the theoretical constructs of the social sciences, but does not generate a hierarchical display.

METHODOLOGY AND DESCRIPTIVE STATISTICS

The study of Judaica headings was made possible by Joseph Galron's compilation, *Library of Congress Subject Headings in Jewish Studies*, which includes headings and references. The second edition (1991), in two volumes, was used for this analysis. A third edition, with the identical format, was recently published by the Association of Jewish Libraries (Galron 1992), and a fourth edition has been announced for publication in 1993.

The research assistant for the project was first asked to compile some statistics to provide an idea of the number and types of Judaica subject headings in *LCSH.*

The first instruction read, "Count all the headings, excluding USE references." (The latter are the equivalent of LC's former *see* references.) Since they begin with a nonpreferred synonym, *USE* references are not headings and are excluded from the count. The total number of Judaica subject headings is 4,193. Markey and Vizine-Goetz (1988, 67) in their general study of the machine-readable *LCSH* counted a total of 159,869 headings. (A journal article based on the full report of the study is Vizine-Goetz and Markey 1989.) Their study is based on the 11th ed. of *LCSH* (1988), while Galron's 2nd edition is based on the 13th edition, issued in 1990. Judaica headings, as defined by Galron, constitute 2.6% of the total corpus.

Galron includes subject headings with subdivisions, and these are reflected in the aforementioned Judaic and general figures. In order to get an idea of the number of simple headings, the graduate assistant was asked to count the number of headings that include dashed subdivisions, e.g., **Abortion—Religious aspects—Judaism**. The total is 2,447, or 58% of all headings. This contrasts with Markey and Vizine-Goetz's finding of 50,591 subdivided headings, i.e., 31.65% (1988, 67).

It is important to note first that this category includes both general headings with Jewish subdivisions, on the order of **Abortion—Religious aspects—Judaism** *and* Jewish headings with general subdivisions. The latter group includes pattern headings. For example, all the subdivisions of **English language** may be applied to Hebrew, and Galron has enumerated all of them. This might explain why the percentage of subdivided headings in Galron is much higher than in *LCSH* as a whole.

The purpose of this count is to distinguish the major subject headings that are enumerated from those that are synthesized from a heading-subheading combination. It is important to note, however, that such synthesis or precoordination is not always characterized by the dash. Sometimes LC uses prepositions to connect two terms, as in **Cataloging of Hebrew imprints.** In other cases LC uses a comma, as in **Cookery, Israeli.** The main heading **Cookery** can be synthesized with any ethnic adjective. A third case is the use of parentheses to provide a type of subdivision of a term, e.g., **Hand washing (Jewish rite)**, although this punctuation mark should really be used in thesauri only to enclose qualifiers that modify ambiguous terms. The term "Hand washing" is not really ambiguous; the heading could have been formulated as "Hand washing—Jewish rite."

The reason for illustrating the three types of headings that are not counted in this category is to demonstrate that LC uses a variety of mechanisms to synthesize headings. Those with dashed subdivisions are the only ones that can be counted mechanically. Prepositional phrases such as *burden of proof* may not be synthesized; the comma may mark a simple inversion, e.g., **Chemistry, Inorganic**, and parentheses may enclose qualifiers as in **Mass (Religion)**; **Mass (Physics)**. Harris (1970) has done a detailed study of the functions of punctuation in *LCSH*.

The next instruction was: "Count the headings that have neither a BT nor an NT." Because the focus of this paper is hierarchy, this category is not included in the study except for this statistic. An example of a heading in this group is **Hamadyah (Israel)**. This heading could have been linked to **Israel** by a BT reference. Cities are parts of countries, and the part-whole relationship is often handled through BT/NT coding, although some thesauri use special codes for this (more on this below).

Of course, USE references have no BT/NT references, and so those were not counted either. Finally, headings with only related-term references were not counted, e.g., **Hebrew language—Definiteness** RT **Hebrew language—Determiners**. The example shows that even a heading with subdivisions can have BT, NT, or RT references. Headings without any of these references are called *orphan* headings. *LCSH* once had a great many of these, but now has far fewer.

Taking the earlier statistic of the number of headings, 4,193, and subtracting this one, we get 1,946, or 46.4% of Judaica subject headings with some kind of hierarchical link. We may compare this with Markey and Vizine-Goetz's (1988, 78) finding that 69% of LC headings have broader or narrower term references. The difference is explained by the fact that Markey and Vizine-Goetz excluded proper names in their calculation. They were working with a machine-readable file in which the type of subject heading is tagged; Galron's print compilation does not include MARC tags.

The next feature examined is *polyhierarchy*. Headings with more than one broader term exist in multiple hierarchies. This is in distinction to shelf classification, in which a topic—or book—can be placed in only one location. There are thesauri, such as the *Art and Architecture Thesaurus* (1990), that do not admit of polyhierarchy, but it is found in natural language: a term may belong to two semantic categories. To take a Judaic example from *LCSH:*

Balfour Declaration
  BT Palestine—History—1917–1948
    Zionism.

The Balfour Declaration is part of both the history of Zionism and of the history of Palestine for the period indicated. The total number of polyhierarchical headings in Galron's compilation is 460, or roughly one-quarter of all the headings with a hierarchical link. Markey and Vizine-Goetz (1988) did not focus on this feature in their study of *LCSH*.

As a major emphasis of this study is on the relationship between classification and subject headings, the next statistic gathered is the number of headings linked to a classification number, that is, where *LCSH* prints a corresponding class number. Only 18.3% of Judaica headings have such a link; the obverse of this statement is that over 80% of LC subject headings in Jewish studies have no explicit link to the LC classification. Markey and Vizine-Goetz (1988, 15) found that twice as many subject headings in the general *LCSH* corpus had a corresponding class number—36.33%.

The example **Hebrew language—Idioms** [PJ 4760] shows that even a subdivided heading may be linked to a class number. The example

Passover
  BM 675.P3 (Jewish service book)
  BM 695.P3 (Jewish festival)

shows that a heading may be linked to multiple class numbers. LC correctly provides the context of each class number. The two class numbers do not exemplify polyhierarchy, however. They underscore the fact that LC classification, like Dewey, is based on discipline and scatters concrete topics throughout the scheme. Thus everything on Passover, for example, is not kept together. Liturgical aspects are in one place, and general works on the holiday in another.

The primary purpose of this study is to examine the deep hierarchies in *LCSH* that mirror those of the classification. We know that there are major sections of the LC classification devoted to Jewish studies, but that Jewish concepts are also scattered throughout all the classes, frequently with the cutter J4. Similarly in the subject heading list, there are many two-level hierarchies consisting of a Jewish concept with a general concept as its broader term, e.g.:

Aggada—Classical influences
BT Civilization, Classical.

(Aggada is a form of Jewish literature consisting largely of legends.)

It would have been nice to have statistics on the number of such flat hierarchies, but the constraints of time did not permit such a count. It must be noted that a flat hierarchy in Galron does not necessarily indicate the end of a hierarchy in *LCSH.* **Civilization, Classical** has a broader term which, in turn, has another broader term. These headings are not directly relevant to Jewish studies, however.

The heart of the project assigned to the graduate assistant, who had studied indexing and thesaurus design, was to follow the trail of BT/NT references in Galron and to build tree structures. Where polyhierarchy exists, that is, multiple broader-term references, she was instructed to create multiple trees. **Adam Kadmon** (Primordial Man), for example, a term from Cabala, has two *top terms* (ultimate broader terms): **Magic** and **Jewish literature**.

Complete tree structures were built for the major concepts in Jewish studies, with the top terms **Jews, Judaism, Hebrew language**, and **Israel**. Extensive work was also done on **Bible**. In the following sections, some of the most interesting findings are reported.

FINDINGS

Placing individual subject headings into hierarchies facilitates the examination of LC's conceptual structure for Jewish topics. **Jews** turns out to be a narrower term of **Christianity**. This is a relationship that the Cataloging Committee of the Association of Jewish Libraries might wish to protest. It is reminiscent of the feature heading *Blood accusation cases* under *Rites and customs* in the second edition of LC class BM—Judaism (Library of Congress 1962, 60).

The **Jews** BT **Christianity** relationship also exemplifies LC's loose criteria in building hierarchical relationships. A narrower term should be a *type* of the broader term. The appropriate superordinate term for **Jews**, if one accepts this relationship, is therefore **Christians**. As for the second broader term, **Ethnology—Israel, Jews** may be viewed as an ethnic group, while **Ethnology** is a discipline. The appropriate broader term would therefore be *Ethnic groups—Israel.*

- **Nutrition -- Religious aspects -- Judaism**
  - **Jews -- Dietary laws**
    - **Gelatin (Jewish law)**
    - **Kashering of utensils**
    - **Kosher food industry**
    - **Kosher restaurants**
    - * **Meat inspection (Jewish law)**
    - **Passover -- Customs and practices**
    - **Shehitah**
      - * **Meat inspection (Jewish law)**
    - **Wine and wine making (Judaism)**

Figure 4. Circular Hierarchy in *LCSH.* (Source: Galron, 2d ed., 1991; verified: *LCSH,* 11th ed., 1988.)

In the current draft revision of the thesaurus standard, an "is a" test is suggested for establishing broader-term relationships (NISO 1992, 51). A Jew *is not* a Christian, and therefore this hierarchy fails the test—on several counts.

Proceeding up the ladder of BT references serves to reveal other kinds of anomalies. In figure 4 we find **Jews—Dietary laws** subordinated to **Nutrition**. That relationship is debatable since the laws of Kashrut fall into the halakhic category of *hukim*, laws for which we do not have a rational explanation. The notable feature of this hierarchy is indicated in the table by asterisks. **Meat inspection** is a narrower term to **Jews—Dietary laws** as well as to **Shehitah** (ritual slaughter). Because **Meat inspection** and **Shehitah** are aligned in the hierarchy, they are known as *siblings*, i.e., they share a parent/broader term. The siblings may be considered "children" of the broader term, but **Meat**

LCC	LCSH
	Jews--Languages
PJ 4501	**Hebrew language**
PJ 5071	**Judeo--Arabic language**
--	**Judeo--Persian language**
--	**Judeo--Tajik language**
--	**Karaim language**
PC 4813	**Ladino language**
PJ 5111	**Yiddish language**

Figure 5. Class—Instance Relationship in *LCSH*.

inspection turns out to be a "grandchild" as well.

The draft revision of the thesaurus standard discusses the desirable checks for software used to manage thesauri (NISO 1992, 93). Although the sibling/narrower term relationship is not explicitly discussed in the standard, it seems inappropriate that two headings should appear both on the same hierarchical level and in a parent-child relationship. **Shehitah** and **Meat inspection** would be more appropriately linked through related-term references.

Figure 5 shows how a hierarchy can serve to identify specific terms in a class and thus be helpful to users who are interested, for example, in the concept of Jewish languages. The left-hand column serves to indicate that the LC classification disperses Jewish languages and enumerates fewer linguanyms (names of languages) than does *LCSH*. *Literary warrant* is the explanation for the latter phenomenon, i.e., LC only adds class numbers for topics on which it acquires monographic literature or complete serials. Since LC does not own Urdu works in Hebrew characters, its catalogers will not develop a subject heading for that language variety. The figure caption is *Class—Instance*. Here we have illustrated how proper names (instances) can be linked to topical terms (which represent classes) in a hierarchy.

Figure 6 contrasts a multilevel hierarchy in the LC subject heading list with that of the corresponding classification schedule. One of the deepest hierarchies built in this project is for Jewish holidays, which are grouped under the quaint heading **Fasts and feasts—Judaism**. The LC classification for this topic does not show much logical grouping, but instead uses alphabetic cuttering, flouting Ranganathan's principle of classification, that alphabetic arrangement should be used only "[w]hen no other sequence of the subjects is more helpful" (1967, 197). It would be logical to juxtapose Rosh Hashanah (the Jewish New Year) and Yom Kippur (the Day of Atonement, which comes ten days later), and perhaps to provide a sequence of holidays reflecting the order of the Jewish calendar. As subject heading lists are by their very nature alphabetically arranged, such a chronological approach is not possible, but there is more logical grouping of Jewish holidays in *LCSH* than in LCC.

Again we find that the "is a" test has not been applied. For example, **Hanukkah decorations** are not a type of holiday. This heading might have been handled as a related term to **Hanukkah**, or the alphabetic juxtaposition of the two headings might have sufficed to create the link. **Synagogue music** is also not a type of High Holiday.

Continuing the array of **Fasts and feasts**, we find another example of the sibling/parent-child hierarchy: **Haggadot, Kibbutz** and **Haggadot, Secular**. (A Haggadah, the singular form of Haggadot, is a liturgical work used at the Seder ceremony on Passover.) As in the prior example, these should be linked through RT references. **Purim parodies**, like **Hanukkah decorations**, are neither fasts nor feasts and should have been linked to the holiday as a related term. The term **Religious calendars** clearly does not belong in a hierarchy of Jewish holidays.

The most interesting feature of this hierarchy is the heading **Sefirah** (the seven-week period between Passover and Shavuot), which has **Lag b'Omer** (the 33rd day of the period) as a narrower term and is in turn a narrower term to **Shavuot** (Pentecost). Displaying the multilevel hierarchy allows us to observe that **Lag**

LCSH

- **Fasts and Feasts -- Judaism**
  - **Festival-day sermons, Jewish**
    - **Rosh Ha-Shanah sermons**
    - **Sukkot sermons**
  - **Hanukkah**
    - **Hanukkah decorations**
  - **High Holidays**
    - **Rosh Hashanah**
      - **Tashlikh**
    - **Shabbat shubah**
    - **Synagogue music--**
      - **High Holiday services**
    - **Yom Kippur**
      - **Ark of the Covenant**
  - **Hol ha-moed**
  - **Hoshana Rabba**
  - **Ninth of Av**
  - **Passover**
    - **Haggadot, Kibbutz**
    - **Haggadot, Secular**
      - **Haggadot, Kibbutz**
    - **Hol ha-Moed**
    - **Matzos**
    - **Quartodecimans**
    - **Seder**
    - * **Sefirah period**
      - * **Lag b'Omer**
  - **Purim**
    - **Purim parodies**
  - **Religious calendars--Judaism**
    - * **Sefirah period**
      - * **Lag b'Omer**
  - **Shavuot**
    - **Sefirah period**
      - * **Lag b'Omer**
  - **Three weeks (Jewish mourning period)**
    - **Ninth of Av**
  - **Tu bi-Shevat**

BM JUDAISM

Practical Judaism
Festivals and fasts - Continued
695 Individual festivals and fasts, A-Z

- .A8 Atonement, Day of (Yom Kippur)
- .H3 Hanukkah (Feast of Lights)
- .L3 Lag b'Omer
- .N4 New moon
- .N5 New Year (Rosh ha-Shanah)
  - Cf. BS1199.R6, Old Testament
- Passover
  - Cf. BS680.P33, Passover in the Bible
    - BV199.P25, Christian liturgy and ritual
- .P3 General works
- .P35 Ritual ceremonies
- Pentecost, see .S5
- .P8 Purim (Feast of Esther)
- .S4 Sefirah period
- .S5 Shabu'ot (Shavu'oth; Pentecost)
- .S6 Simhat Torah
- .S8 Sukkot (Sukkoth)
- .T4 Three Weeks
- .T9 Tu bi-Shevat
- Yom Kippur, see .A8

Figure 6. Comparison of a Deep Hierarchy in *LCSH* with Corresponding Class in LCC.

b'Omer is a narrower term to **Shavuot**, i.e., the 33rd day is an NT to the 50th day!

The building of tree structures is thus a device for examining the correctness of a hierarchy. Actually, Lag b'Omer is *part of* Sefirah. Using the codes BTP (broader term-partitive) and NTP (narrower term-partitive) would serve to distinguish the genus-species relationship from part-whole (NISO 1992, 53), and to prevent false inferences.

In this author's opinion, one of the least

- **Palestine--History--To 70 A.D.**
  - **Judaism--History--To 70 A.D.**
    - **Jews--History--To 70 A.D.**

- **Palestine**
  - **Israel**
  - **Israel--History**
    - **Israel-Arab conflicts**
      - **Israel-Arab Border Conflicts, 1949 -**
      - **Israel-Arab War, 1948-1949**
      - **Israel-Arab War, 1967**
      - **Israel-Arab War, 1973**
      - **Lebanon--History --**
        - **Israeli intervention, 1982-1984**

Figure 7. Hierarchies of Jewish History and Israeli History. (Source: Galron, 2d ed., 1991.)

acceptable components of the LC classification is the schedule for Jewish history, which is intertwined with the history of Israel. It was expected that the LC subject heading list would reveal a different hierarchy, but surprisingly it did not (see figure 7). The history of the Jews is subordinated first to the history of Judaism, and then to the history of Palestine. Following the trail of **Palestine** downward, we find that **Israel** is treated not as a synonym, but as a narrower term. (More work for cataloging activists.)

Another deep hierarchy was built for Jewish liturgical objects. The enumeration in figure 8 would be very useful to researchers and is not replicated in LC Class N (1970), which has a single number for Jewish ceremonial art—NK 1672.

Again, there are structural anomalies, with **Hanukkah lamp** and **Menorah** as siblings, but the former is also a narrower term to **Menorah**. **Scribes, Jewish—Handbooks, manuals** is a narrower term to three of the headings for liturgical objects, but scribes are not objects. These headings should have been linked through an RT reference.

- **Jewish art and symbolism**
  - **Judaism--Liturgical objects**
    - **Ark of the law**
    - **Candles and lights**
      - **Hanukkah lamp**
      - **Menorah**
    - **Etrog**
    - **Hanukkah lamp**
    - **Lulav**
    - **Menorah**
      - **Hanukkah lamp**
    - **Mezuzah**
      - * **Scribes, Jewish--Handbooks, manuals**
    - **Myrtle (Sukkot)**
    - **Spice boxes (Jewish liturgical objects)**
    - **Tallith**
    - **Tefillin**
      - * **Scribes, Jewish--Handbooks, manuals**
    - **Torah scrolls**
      - * **Scribes, Jewish--Handbooks, manuals**
      - **Torah wrappers**
    - **Willow (Sukkot)**
    - ***Zizith***

Figure 8. Narrower vs. Related Terms.

CONCLUSIONS AND RECOMMENDATIONS

There is not a great deal of replication in the hierarchical structures of the two systems for subject access in the domain that was examined. In information science research, it has been shown that different search techniques retrieve different items, but that both sets may be relevant (Croft 1989). The idea of "alternative sources of evidence" may be applied to research in cataloging: the explicit hierarchy of LC classification and the implicit one of *LCSH* may both assist the library user.

The methodology of this study is applicable to subject headings from any discipline. Compilations of subject headings in a particular domain, e.g., Kessinger (1990), facilitate such analyses, but it is also possible to conduct such studies by using a top-down or bottom-up approach in printed or machine-readable *LCSH.* A top-down study would take the name of a discipline such as **Physics** and follow the trail of narrower-term references. A bottom-up approach would begin with a term such as **Superconductors** and follow the broader-term references.

Tracing the hidden classification in LC subject headings for any domain has a number of potential practical applications. First, the Library of Congress could apply this technique to reviewing the syndetic structure of *LCSH.* Taylor (1992, 416–17) cites several studies which demonstrate that the automatic conversion from *see also* references to BT/NT and RT references in *LCSH* is problematic and notes that LC has not had time for a systematic review of the syndetic structure. LC might consider building some checks into its system for the management of its subject headings in order to avoid circular hierarchies (Milstead 1991).

A second potential application is in individual libraries. LC has been encouraging catalogers from other libraries to establish subject headings ("Establishing" 1988), and the building of relationships is an important part of this activity. Many librarians also catalog and index special collections for which they need to establish terminology and relationships. Displaying BT/NT references in a tree structure facilitates the verification of hierarchical relationships.

Finally, many librarians work in institutions that have online catalogs, and such librarians might have the privilege of participating in system and interface design. If hierarchical displays of subject headings can be presented to users, this will help them navigate through the system. It is surprising that *Headings for Tomorrow: Public Access Display of Subject Headings* (ALCTS, 1992) does not suggest this form of display, as it focuses mainly on the question of whether punctuation should be ignored in the arrangement of headings with subdivisions, or whether it should be considered to create logical groupings. In the online catalog of tomorrow, we can display the syndetic structure of *LCSH* in a form that facilitates the broadening and narrowing of subject searches, i.e., by making the hidden classification explicit.

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Digital-to-Microfilm Conversion: An Interim Preservation Solution

Anne R. Kenney

A project currently is being conducted at Cornell University to test the feasibility of using digital image technology to preserve and improve access to deteriorating library materials. The findings of an experiment to produce microfilm from digital images by means of an electron beam recorder are reported in this article. Cornell evaluated the quality of the microfilm, computed its "digital resolution" based on a formula recently developed by an Association for Information and Image Management (AIIM) technical committee, and compared it to printers' type sizes used by publishers during the period 1800–1950. Based on these analyses, Cornell has concluded that a scanning resolution of 600 dots per inch is sufficient to produce digital computer output microfilm (COM) that meets American National Standards Institute/Association for Information and Image Management (ANSI/AIIM) standards for image quality for virtually all books published during the period of paper's greatest brittleness. Although the Cornell experiment demonstrated the technical feasibility of producing preservation microfilm, some of the issues surrounding quality, processing, costs, and vendor services associated with the conversion process have yet to be resolved. Nonetheless, digital technology's primary preservation use in the immediate future could be to serve as an alternative means for capturing material and producing microfilm that meets preservation standards, while also allowing for the flexibility in storage, distribution, and access associated with the technology.

The problems associated with paper produced since the mid-nineteenth century and the crisis these represent for libraries and archives are well known. As much as one-third of the material in this nation's research libraries is brittle, and there are indications that the situation might be much worse in some parts of the world. Exponential increases in book production have greatly exacerbated the twin dilemmas of preservation and physical access. Although bibliographic control of library materials has improved considerably over the past twenty years, much of the material the records represent is unusable or fast approaching this condition.

CURRENT REFORMATTING TECHNIQUES

At the present time, libraries respond to the brittle-books crisis by producing either preservation photocopies or microfilm versions of the originals. Both strategies

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fulfill important access needs. Photocopying benefits the local patron by replicating the medium and format of the original document; however, the production of a single archivally sound replacement copy does not contribute significantly to the national preservation effort. This effort is based on the notion of reformatting deteriorating material once, storing a preservation master, and distributing copies on demand.

Microfilm, if processed and stored in strict accordance with national standards, has an extremely long life and may be duplicated almost indefinitely with only minor loss of information. The technology itself is stable and the film produced may be read on any microfilm reader. While the high-contrast film currently used is not totally acceptable for reformatting a large percentage of illustrated material or low contrast material, newer continuous-tone films and stable-color films that will improve this situation are slowly becoming available. As such, microfilm is the preferred medium for copying, and it forms the basis of a twenty-year national brittle-books program to preserve three million titles. Nonetheless, microfilm is not a format favored by many researchers. For instance, in the field of mathematics, users "object to the inconvenience of microfilm, especially for monographs. . . . Hardcopy reformatting (through photocopying) of older monographs is the preferred way to provide access in many libraries" (Gould and Pearce 1991, 65–68).

Digital image technology—the electronic copying of scanned documents in image form—promises to combine the best features of both microfilm and photocopy. The text contained in these images is not converted to alphanumeric representation at the time of scanning, although the potential exists for such conversion from the digital files at some later time. The present capabilities of optical character recognition are inadequate for capturing both the information and the presentation of the original page, which is critical when replacing rapidly self-destructing books, especially when one considers the vast number of languages, illustrations, typefaces, and printing techniques present in the collections of modern research libraries.

Digital technology offers advantages in terms of ease of further reformatting and duplication, image capture enhancements, and the opportunities for improved access and space savings. While there is great promise in the use of digital technology as a preservation option, funding agencies and the library preservation community are reluctant to embrace it wholesale until issues such as the development of nationally recognized standards for creation, compression, and transmission of digital images are adopted and the institutional requirements for storage, refreshing, and backup are clearly defined. As an interim measure, the production of digital computer output microfilm (COM) that meets preservation standards could serve as the archival master and thus contribute to the national preservation effort. The digital files could then be used as the "reproduction" master, to provide online network access and to produce printed copies on demand. There are decided advantages in being able to separate the medium for preservation from the medium for duplication, access, and use.

CORNELL / XEROX JOINT STUDY IN DIGITAL PRESERVATION

Cornell University and Xerox Corporation, with the support of the Commission on Preservation and Access, have collaborated for the past several years in an investigation of the use of digital technology to preserve and make available deteriorating library materials (Kenney and Personius 1992). The project team makes use of a networked scanning system, known as the College Library Access and Storage System (CLASS), that was developed by Xerox Corporation and Cornell University. The primary preservation emphasis of this study has been on the capture of brittle books as digital images and the production of printed paper facsimiles. To date, more than 1,000 volumes have been scanned and digitized. Cornell has also investigated the feasibility of digital-to-microfilm conversion.

Cornell's investigation of digital COM centered on determining whether digital files could be used to produce microfilm output that meets national technical specifications for preservation. These specifications cover a wide range of issues, including the preparation of documents; composition of the film stock; quality of image capture as defined by reduction ratio, image placement, resolution, and density; film processing; and storage (AIIM 1991; Gwinn 1987; Elkington 1992).

ELECTRON BEAM TECHNOLOGY

In the fall and early winter of 1991–92, Cornell tested the conversion process for producing computer output microfilm from digital images. Although a number of companies in the United States offer digital-to-microfilm conversion, Cornell located only one, Image Graphics, Incorporated, of Shelton, Connecticut, that was prepared to handle high-speed, high-resolution film recording. Since 1974, Image Graphics has become a leading developer of electron beam technology for government and industry. Electron beam recorders (EBR) record directly from digital data to film, and according to Image Graphics, the EBR provides ten times better resolution, speed, and dynamic range than conventional cathode ray tube, laser, and photomechanical imaging devices.

DOCUMENT PREPARATION

Image Graphics agreed to run a test conversion of Cornell's digital images. The files for one volume were copied at Cornell onto magnetic tape along with AIIM Scanner Test Charts (as cited in ANSI/AIIM MS44-1988). The volume, titled *The Steam Turbine: The Rede Lecture 1911*, by Sir Charles A. Parsons, contained halftones and line drawings embedded in text. The volume had been scanned one page per digital image using the Xerox prototype scanner at 600 dpi (dots per inch) resolution. Technicians experimented with new Xerox software for windowing that segments a page containing both text and illustrations in a manner that enables different settings to be used and optimizes the reproduction of both.

FILM STOCK

The magnetic tape was sent to Image Graphics, where the digital images were recorded on a Micrographics EBR System 3000, an electron beam recorder used to produce microfilm from high-resolution digital images and gray scale. The microfilm output from the digital files was produced on 35mm, nonperforated Kodak Direct Electron Recording Film, SO-219, although, as noted below, other films can be substituted.

The SO-219 film is a silver-gelatin microfilm designed expressly for use in recorders that expose film by means of an electronic beam brought to bear directly on the emulsion. The film emulsion layer is unusually thin and characterized by extremely fine grains and a relatively high silver-to-gel ratio; the support is ESTAR base, a clear, 4 mil polyester film (Eastman Kodak 1981).

Discussions with several experts in the micrographics industry about the use of the SO-219 film led to some questioning of its longevity. Bob Mottice of University Microfilms, Inc., reviewed the film specifications and found them questionable because of the presence of a layer of conductive material between the emulsion and the base. This layer serves to disperse the charge accumulated in the emulsion during exposure. Mottice felt that unless the Kodak specification indicated that the film was for archival use, it should not be considered archival. Doug Nishimura of Image Permanence Institute found the specifications did not provide sufficient information to determine the permanency of the film. He noted that the film claims to meet ANSI IT9.1-1988 and did not think that the absence of antihalation would affect the permanency. Jim Dove, Larry Leveque, and Gordy Lair of Eastman Kodak thought the film would be suitable for archival standards. Lair could not find evidence of "any abnormal keeping properties" and felt that the film would be "good for fifty years" (Lair 1991).

At Cornell's request, Image Graphics was able to produce a sample strip of several images using Kodak Imagelink HQ, a film that is in wide use in preservation microfilming.

PROCESSING

Image Graphics wet-processed the film in an Oscar Fischer processor, at a speed of five to seven feet per minute. The company used Kodak Ultratek developer at a concentration of ten to one. The film was rinsed with tap water filtered through a 1-micron filter, then double fixed, using Kodak Rapid Fix with Hardener, and rinsed in a final bath of filtered tap water.

Cornell sent samples of the SO-219 and the Imagelink HQ films to Biels Microfilm Corporation of Buffalo, New York, where a methylene blue test (as defined in ANSI PH 4.8-1985) was conducted to determine the amount of residual thiosulfate concentration. If fixing and washing are inadequate, thiosulfates or silver salts, or both, will be retained by the film. These can break down, especially under poor storage conditions, to produce yellow staining in clear areas and fading in areas containing image silver.

The test results indicated unsatisfactory levels of chemical residue remaining on the film. Concentrations of less than 1.4 mg indicate archival quality. The Kodak Imagelink HQ had an actual concentration of 2.4 mg; the Kodak Direct Electron Recording, SO-219, had an actual concentration of 2.5 mg. Both films failed the methylene blue test.

An inspection of the SO-219 film over a lightbox revealed additional problems associated with the processing of the film. The film was dirty, dusty, and slightly scratched, and there were frequent splotches along the edges, indicating that the film had not been properly washed and dried. While the results reveal improper processing of the film on the part of Image Graphics, they do not have a direct bearing on the process of digital-to-microfilm conversion. Once the film is created, the method of processing is identical to that used with conventional film, and with proper handling, the film should meet standard archival specifications.

DENSITY, IMAGE PLACEMENT, AND REDUCTION RATIO

Image Graphics produced both a negative and a positive version of the film. Density readings taken on the negative averaged 1.21, which falls within the national guidelines for background density ranges for master negatives. However, it should be noted that, unlike conventional micrographics, film density for digital COM is a software-controlled variable within the EBR System 3000 recorder. Image Graphics could have adjusted the density to any level.

Reduction ratio and image placement are also controlled by system software. Prior to recording the digital images on film, Image Graphics had rotated the images for film placement of two images per frame in the cine position at 10X reduction ratio, based on Cornell's specifications. While this conversion was successful, the light box inspection of the positive film revealed that the spacing between frames was too wide, which was attributed to incorrect software calculations for image placement. Further, the white background against which the images were placed made it difficult to discern the edges of individual pages, and this too would need to be addressed through software programming.

PHOTOGRAPHIC RESOLUTION AND THE CAPTURE OF TEXT

A standard microfilm version, including three generations of film, of *The Rede Lecture* was prepared by Cornell Photo Services for comparison purposes. The positive copies produced by the two technologies were reviewed on identical side-by-side microfilm readers and compared to the original volume. Staff members who performed a frame-by-frame comparison could discern no difference in the capture of text and line art between the two films. In both cases the images viewed were crisp, with sharp contrast between text and background. Printouts of text and line art from the two films were made using a Minolta RP 6057 Reader/Printer and are located in appendix A.

Staff members also examined the Institute of Electrical and Electronic Engineers (IEEE) Scanner Test Chart under 100X magnification. The microscopic inspection of the technical targets reproduced there revealed that the resolution readings taken on both the positive and negative versions of the digital COM were identical, indicating no generational loss between copies. The same resolution readings were also achieved when the image of the test target was displayed at 600 dpi on the computer monitor, indicating negligible or no generational loss between the digital file and the COM. In contrast, there was a drop of two readings from the archival master to the service copy in the conventional film.

Quality Index (*QI*) is a means for relating resolution and text legibility. While type size might be the most important factor in legibility, other factors should be taken into consideration, including typeface; the use of italics and boldface; pitch; line width; interlinear spacing; counter; background color; printing surfaces; the degree of fading, damage, and acid migration; and the quality of the original document. In traditional microfilming, some of these factors will be addressed by the background density used rather than the Quality Index (Craig 1980, 32; Paterson and Tinker 1940).

Quality Index is based on the measurement in millimeters of the height of the smallest significant character, usually the lower case letter "e," as read from the original document. This measurement (*h*) is then multiplied by the smallest resolution pattern that is resolved on the film (*p*), and the resultant number is used as the Quality Index (*QI*), e.g., $p \times h = QI$, or $6.3 \times 0.8 = 5.04$. Quality Index is described in detail in ANSI/AIIM MS23-1991. The standard states that a *QI* of 5.0 is considered medium because all alphanumeric characters are readable without difficulty, but serifs and fine detail might be lost. A *QI* of 5 has also been determined to be acceptable quality for applying Optical Character Recognition (OCR) software (AIIM 1992, 15). A *QI* of 8.0 is considered excellent because serifs and fine detail are resolved. While the ANSI/AIIM standard indicates that a *QI* of 5 is acceptable, the Research Libraries Group (RLG) requires a *QI* of 8 for its preservation microfilming projects (Elkington 1992; Gwinn 1987, 105–7).

The resolution readings on the digital COM measured 6.3 line pairs per millimeter (lpm) for the equivalent of the third-generation service copy, indicating a Quality Index rating of High Quality (8.0) for the master negative for material where the smallest "e" is 1.3 mm (for 6.3 lpm), and a Quality Index Rating of Medium Quality (5.0) for material where the smallest "e" is 0.8 mm (for 6.3 lpm). Conventional microfilming is superior at capturing resolution: Readings on the archival master were 10 lpm, indicating a Quality Index Rating of High Quality for material where the smallest "e" is 1 mm high. To achieve the resolving power of standard micrographics would require scanning at about 1,000 dpi. Don Willis of University Microfilms, Inc., argues for scanning at 600 dpi with 8 levels of gray to achieve "archival resolutions" (Willis 1992).

DIGITAL RESOLUTION VS. PHOTOGRAPHIC RESOLUTION

Although the resolution reading on the digital COM measured 6.3 lpm, caution should be used in equating digital resolution to photographic resolution. In fact, the ANSI/AIIM MS44-1988 standard, "Recommended Practice for Quality Control of Image Scanners," advises against the use of resolution test patterns for scanners with a resolution less than or equal to 600 dpi because of "(1) the problems associated with the random placement of samples, and (2) the conflicting requirements placed on the threshold." What this means is that, depending on the placement of the target on the scanner platen, "on one scan the output target may look sharp and on the next it may look broken or filled in, when in fact, nothing has changed!" (ANSI/AIIM 1988).

The draft AIIM technical report on

photographic and electronic imaging resolution suggests an alternative method for determining Quality Index for digital imaging that takes into consideration the probability of misregistration (AIIM 1992, 15). The proposed Quality Index equation for digital resolution (*Rd*) of a scanner is

$Rd = [(2 \times QI)/(h \times 0.039)] \times 1.5$.

In this equation, the traditional *QI*, which assumes resolution units of line pairs per millimeter, was doubled because digital resolution measures just dots or lines. The height (*h*) of the smallest "e" is defined in inches in the tutorial. To convert millimeters to inches, the figure *h* is multiplied by 0.039. To compensate for possible misregistration in the scanner, the total figure is increased by 50%, or multiplied by 1.5.

To determine the height of the smallest "e" that can be resolved digitally, the formula becomes

$h = \{[(2 \times QI)/Rd]/0.039\} \times 1.5$.

The digital resolution (*Rd*) of the CLASS scanner used equals 600, and if the *QI* were to equal 8, the maximum height that can be resolved would be:

$h = \{[(2 \times 8)/600]/0.039\} \times 1.5$,

which equals 1 mm.

If a *QI* of 5 (medium) were acceptable, the height of the smallest "e" that can be resolved would equal

$h = \{[(2 \times 5)/600]/0.039\} \times 1.5$,

or 0.6 mm.

These figures indicate that 600 dpi scanning can render text that is several millimeters smaller than the traditional *QI* method would have indicated. Recall that in using the traditional *QI* for 6.3 resolution, a score of 8 would have been possible for the smallest "e" measuring 1.3 mm and a score of 5 would have been possible for the smallest "e" measuring 0.8 mm.

PRACTICAL APPLICATION FOR 600 DPI SCANNING

Given the CLASS scanning system's technical capability to capture text, one must then determine its practical application in a preservation context. The question becomes, is 600 dpi scanning adequate to capture the range of printing found in brittle books? One way to answer this is to translate Digital Quality Index requirements into printing type size for material published since the mid-nineteenth century. This translation, however, is not straightforward.

There are approximately 72 points to an inch of type, so each point equals 1/72 of an inch or 0.35 mm. Point size is the measure from the highest ascender (such as the upward stroke on the letter "d") to the bottom of the lowest descender (e.g., "p"). Because no individual letter fills the entire body of the point size, measuring the printed letter will not result in the point size.

The "x-height" is the height of the lower-case letters exclusive of ascenders or descenders, and is the equivalent to the size of the smallest "e." X-height, not the point size, conveys the visual impression of the size of the letter and in large measure governs legibility. Types with a large x-height, such as Times New Roman, Helvetica, or Century Expanded, will present the illusion of being larger than types with a small x-height, such as Centaur, Garamond, or Bodoni, even when both types are the same point size. The former will also score higher on Quality Index ratings. Almost all new typefaces are designed with large x-heights (Craig 1980, 25; Margulis and Schroder 1983; Updike 1922).

Although most books today are printed in the 10- to 14-point range, a survey conducted in the 1930s of more than 1,500 American and foreign scientific journals, textbooks, and American nonscientific magazines revealed a marked preference by publishers of 9-, 10-, and 11-point type. The survey indicated a preference among publishers for 11-point type, but noted that 10 point was very commonly used for books, bulletins, reports, and other publications. It also revealed that none of the publications surveyed was printed below 8-point type, with the exception of 1% of the American nonscientific journals, which were printed at 7-point type. The report concluded that "type sizes smaller than 8 point or larger than 12 point are quite unsatisfactory" (Paterson and Tinker 1940, 148). This position is supported by others, including Clayton Whitehill (1947, 92), who contends that "reading becomes a chore" below 10-point type. Theodore De Vinne (1900, 66) noted that while 10-, 11-, and 12-point type were popular, 9-point was frequently selected for small and cheap books.

One hundred and five measurements of the height of the smallest "e" at 9, 10, 11, 12, and 14 points were taken for a variety of typefaces from the following sources: Lewis' *Handbook of Printing Types*, *Book of SPECIMEN Pages*, and the *AIIM Scanner Test Chart #2*. Typical x-heights in the 9- to 14-point sizes ranged from 1.34 mm to 2.15 mm, which are easily rendered by 600 dpi scanning. The x-height of the main text in *The Rede Lecture 1911*, for example, measured 2.1 mm, which would require a scanning resolution of 300 dpi to achieve a Digital Quality Index of 8.

Some charts, formulas, diagrams, illustrations, advertisements, and footnotes are printed in smaller types, and to be captured successfully will require higher scanning resolutions. Modern phototypesetting, introduced in the mid-1960s, offers a range of standard sizes from 4 or 5 points to 72 points. By contrast, items printed in the nineteenth century and first half of the twentieth century—the period during which most brittle books were published—were set by hand or by casting (monotype or Linotype), using metal type. With metal type, the ink tends to spread, making the edges of the letterforms uneven, so there was a limit to how small a typeface could be effectively printed. Metal type was commonly produced in sizes ranging from approximately 5 point to 72 point, with 6 point being the smallest point size for most typefaces (Craig 1980, 18–19, 24; Tarr 1949, 59; *Book of SPECIMEN Pages* 1934; Lewis 1947). A large number of advertisements containing type as small as 5, 5 1/2, and 6 point were found in publications from the 1880s. One study revealed that 85% of full-page ads in *Century* magazine in 1881 were printed in 8-point type or smaller. The percentage, however, became less with each succeeding decade. In 1910, only 5% were found to use such small type (Starch 1923).

Five point was also used in pocket editions of the Bible, prayer books, and small manuals. Four and a half point was used for special miniature editions of classics. Type 4 point and below was invented in the nineteenth century. Some 3 point was used in the United States for music, piece fractions, and borders only. Type sizes as low as 2 point were cut by hand. While these smaller type sizes were "wonderful evidence of skill," they were of "slight value in the practice of printing" (De Vinne 1900, 67–68).

Table 1 lists the x-heights of smaller point sizes for common typefaces. In a sample of 26 typefaces used from the mid-nineteenth century on, the x-height for 6-point type ranged from 0.9 mm to 1.4 mm, with the average measuring 1.17. Ten examples of 5-point text were available, and the x-height measured from 0.9 mm to 1.1 mm, with the average being 0.98. In *The Rede Lecture 1911*, the x-height measured 1.5 mm for captions and 0.9 mm for text used in diagrams and charts. Based on these figures and the Digital Quality Index measurements noted earlier, 600 dpi scanning should render the complete range of metal type in common usage from the mid-nineteenth century. This conclusion is supported in part by a survey of 50 quality-control report forms for a current National Endowment for the Humanities-sponsored preservation microfilming project conducted at Cornell. The height of the smallest significant character ranged from 1 mm to 1.9 mm—well within the CLASS scanner's capability.

Some experts, including Don Willis (1992, 33) of University Microfilms, Inc., have argued that 300 dpi would preserve 99.9% of a page's information content and provide "adequate access resolution" although not archival resolution. Michael Lesk (1992, 8) of Bellcore suggests that 300 dpi scanning is sufficient to ensure readability down to 5- or 6-point type. The ANSI/AIIM MS44-1988 Standard (10) states, "A properly adjusted scanner with a scan resolution of 300 points per inch should preserve the distinction between lower case letters on 4-point type." Most agree, however, that if a high-fidelity copy of the original is required, higher resolutions must be used.

TABLE 1

THE RENDERING OF SMALLER TYPE SIZES AT 600 DPI SCANNING

Source[1]	Typeface	x-height (mm)	Digital QI Rating[2]	Reproduction Quality[3]
Specimen Pages	Oldstyle #1	1.20	Excellent	Excellent
Specimen Pages	Oldstyle #1 Italic	1.20	Excellent	Excellent
Specimen Pages	Oldstyle #3	1.30	Excellent	Excellent
Specimen Pages	Oldstyle #3 Italic	1.30	Excellent	Excellent
Specimen Pages	Modern #2	1.40	Excellent	Excellent
Specimen Pages	Modern #2 Italic	1.40	Excellent	Excellent
Specimen Pages	Modern #3	1.20	Excellent	Excellent
Specimen Pages	Modern #3 Italic	1.30	Excellent	Excellent
Specimen Pages	Devinne	1.20	Excellent	Excellent
Specimen Pages	Devinne Italic	1.20	Excellent	Excellent
Handbook of Printing Types	Plantin	1.20	Excellent	Excellent
Handbook of Printing Types	Plantin Italic	1.10	Excellent	Excellent
Handbook of Printing Types	Baskerville	1.10	Excellent	Excellent
Handbook of Printing Types	Baskerville Italic	1.10	Excellent	Excellent
Handbook of Printing Types	Times New Roman	1.20	Excellent	Excellent
Handbook of Printing Types	Times New Roman Italic	1.20	Excellent	Excellent
Handbook of Printing Types	Perpetus	1.20	Excellent	Excellent
Handbook of Printing Types	Perpetus Italic	1.10	Excellent	Excellent
Handbook of Printing Types	Bodoni	1.10	Excellent	Excellent
Handbook of Printing Types	Bodoni Italic[4]	1.00	Excellent	Excellent
AIIM Scanner Test Chart	Spectra	1.20	Excellent	Excellent
AIIM Scanner Test Chart	Times Roman	1.00	Excellent	Excellent
AIIM Scanner Test Chart	Century Schoolbook Bold	1.10	Excellent	Excellent
AIIM Scanner Test Chart	Bodoni Italic[4]	0.90	Medium	Excellent
AIIM Scanner Test Chart	News Gothic Bold Reversed	1.20	Excellent	Excellent
AIIM Scanner Test Chart	Spartan Medium	0.90	Medium	Excellent
Book of Specimen Pages	Modern #10[5]	1.10	Excellent	Excellent
Book of Specimen Pages	Modern #10 Italic[5]	1.10	Excellent	Excellent
Practice of Typography	Unkown, Solid	0.90	Medium	Good
Practice of Typography	Unkown, Solid	0.95	Medium	Good
Stephenson Blake Printing Type	Modern #17	0.90	Medium	Good
Stephenson Blake Printing Type	Modern #17 Italic	1.00	Excellent	Good
Stephenson Blake Printing Type	Modern #20	1.00	Excellent	Medium

TABLE 1 Continued

Source[1]	Typeface	x-height (mm)	Digital QI Rating[2]	Reproduction Quality[3]
Stephenson Blake Printing Type	Modern #20 Italic	1.00	Excellent	Medium
Stephenson Blake Printing Type	Granby	0.90	Medium	Good
Stephenson Blake Printing Type	Grandby Bold	0.90	Medium	Good
AIIM Scanner Chart	Spectra	0.90	Medium	Medium
AIIM Scanner Chart	Times Roman	0.70	Medium	Medium
AIIM Scanner Chart	Century Schoolbook Bold	0.80	Medium	Medium
AIIM Scanner Chart	Bodoni Italic	0.60	Medium	Medium/ Marginal
AIIM Scanner Chart	New Gothic Bold Reversed	0.80	Medium	Medium
Practice of Typography	Unknown, Solid	0.65	Medium	Medium
Practice of Typography	Unkown, Leaded	0.70	Medium	Medium
IEEE Test Chart	Spartan Medium	0.60	Medium	Medium/ Good
IEEE Text Chart	Spartan Medium	0.30	Poor	Poor

[1] *Book of Specimen Pages*, New York: Vail Ballou Press, 1934; *A Handbook of Printing Types with Notes on Style of Composition and Graphic Processes Used by Cowells*, London: W. S. Cowell, Ltd., 1947; Thedore Low De Vinne, *The Practice of Typography, A Treatise on the Processes of Type-Making, The Point System, the Names, Sizes, Styles and Prices of Plain Printing Types*, New York: The Century Co., 1900; *Stephenson Blake Printing Types, The Caslon Letter Foundry, Sheffield England*, Sheffield, England: 1969; *AIIM Scanner Test Chart #2*; IEEE Std 167A-1987.

[2] There are four levels of *QI* defined in ANSI/AIIM MS23-1991:
Excellent—all alphanumeric characters easily readable, with serifs and fine detail resolved (*QI* = 8)
Medium—all alphanumeric characters readable without difficulty, but fine detail and serifs may be lost (*QI* = 5)
Marginal—readable (*QI* = 3.6)
Poor—characters barely legible, unacceptable (*QI* = 3)

[3] Cornell staff measured reproduction quality in five categories:
Excellent—all alphanumeric characters easily readable, with serifs and fine detail represented
Good—letters separate and distinct serifs rendered, some thickness of lines
Medium—all alphanumeric characters readable without difficulty, but fine detail and serifs may be lost
Marginal—readable
Poor—characters barely legible

[4] Variation in reading between the two samples for Bodoni.

[5] Poor reproduction of lower-case letters in original volume.

Cornell's findings support this position. Lower-resolution scanning can produce satisfactory copies from crisp, high-contrast modern documents. However, many of the deteriorating volumes scanned at Cornell contained irregular features typical of the production typography and printing techniques of the past century and a half. Some were illustrated with fine-line drawings and annotations or were printed in languages such as Japanese where the buildup of characters comprised of varying strokes is difficult to reproduce at lower resolutions. More than half of the volumes contained mathematic formulas. It was important to the mathematics faculty that these were fully captured. They insisted, for example, that plus signs not be turned into minus signs, which did occur in one instance of using 300 dpi scanning. The 600 dpi copies successfully captured most of these publishing challenges to represent faithful and legible reproductions of the originals. For instance, at 600 dpi resolution, the isolated characters on the *AIIM Scanner Test Chart* #2 were all fully represented, including the degree symbol. At 300 dpi resolution, the symbol was displayed as a solid dot.

VISUAL INSPECTION

While the Digital Quality Index provides a useful means for translating between digital and classical resolution, the authors of the tutorial on photographic and electronic imaging resolution recommended strongly that users verify the quality of image capture by visually examining the scanner's output. Samples of the 5- and 6-point type were scanned, printed on paper, and examined both with the naked eye and under an eye loupe. As table 1 indicates, the quality of the reproductions was uniformly high. All were easily readable, with serifs and fine details rendered. It was interesting to note that while the facsimile of the 5-point sample of Modern Number 10 was clearly readable, the initial inspection under magnification appeared unacceptable. Some characters were thickened or filled in, and several of the ascenders truncated. A check of the original page, however, revealed that it had been poorly printed—the facsimile had merely captured these imperfections. It is clear that part of one's interpretation of the printed page is mental rather than visual. The eye is forgiving of minor imperfections and trained to "see" complete characters where only partial ones exist.

Some modern technical literature is printed at 4-point type, and some charts and diagrams used in books from the past century and a half contain handwritten characters that are below 5-point type in size. Measurements of 8 typefaces at 4 point ranged from 0.6 mm to 0.9 mm, with an average of 0.72 mm. The height of the smallest handwritten character in the line drawing of the ship from page 41 of *The Rede Lecture* measured 0.55 mm, and was legibly produced (see sample in appendix A). According to the Digital Quality Index rating for 600 dpi scanning, 4-point text will be rendered with medium quality (QI=5).

An examination of a number of scanned samples of 4-point type under magnification revealed that while all alphanumeric characters were clearly readable and distinct, type with serifs or in italic was more difficult to capture than sans serif or Roman type. Note on table 1 that the Roman Spartan Medium, which is a very plain, sans serif type with an x-height of 0.6 mm, reproduced extremely well, while the Italics Bodoni, an ornate serif type, which also has an x-height of 0.6 mm, reproduced without some of the fine detail or serifs intact. The photographic nature of the IEEE target contributes to the higher quality of the rendition of the Spartan Medium type. The AIIM target, which contains samples of the Bodoni Italic, is an ink-on-paper type and more closely resembles letterpress printing common in books published in the nineteenth and early twentieth centuries.

Finally, one sample of 2-point type located on the IEEE test chart was scanned, but 600 dpi resolution was not sufficient to reproduce legibly all the lower-case characters. The x-height of the 2-point text measured 0.3 mm. Obviously type this small falls below the range that 600 dpi resolution can reproduce. Note, however, that the 2-point was also beyond the conventional film's capabilities.

Based on these experiments, it appears that the resolution power of 600 dpi binary scanning will produce film that meets RLG's specifications for excellence (QI=8) for most text printed at 5 point type and larger, and it can be used to produce microfilm that meets the ANSI/AIIM MS23-1991 standard for acceptable quality (QI=5) for text printed at 4-point type and larger. Given the CLASS scanning system's technical capabilities and the widespread use of typefaces 5 point and above in the printing of books between 1800 and 1960, Cornell has concluded that 600 dpi scanning and the production of digital COM can serve as a viable means for capturing and preserving brittle books. Obviously, higher-resolution scanning would be better, and 900 dpi production scanners might be practical before long. However, a guiding principle of the Cornell project was that the use of digital technology must result in products of sufficiently high quality and must be cost effective to be considered viable for the preservation of deteriorating library materials. Higher-resolution scanners are currently available, but because the scanning time is very slow, the cost of image capture would be prohibitive.

THE CAPTURE OF ILLUSTRATED TEXT

The CLASS scanning system was designed primarily to capture text and, as has been shown, it is quite effective in doing so. It also has potential for reproducing illustrations in a manner comparable or superior to high-contrast black-and-white microfilming. Indeed, critics of the Photographic Quality Index method say that it fails to consider the quality and composition of the original document. This is lessened if the *QI* is linked with the guidelines for background density, although a microfilm reproduction of illustrated text can be within acceptable ranges for both density and resolution and still represent an unsatisfactory copy of the original.

The Commission on Preservation and Access' Joint Task Force on Text and Image recently found that current microfilming techniques are adequate for preserving illustrated text that consists of line drawings, woodcuts, or other simple "edge-based representations." However, the report also concluded: "The preservation of halftone illustrations and accompanying text cannot be handled satisfactorily—for most scholarly purposes—by high-contrast black-and-white filming. Too much differentiation within the image is lost, and essential details needed for interpretation simply vanish" (Joint Task Force 1992, 26). As noted earlier, there is great promise in the use of continuous-tone or color microfilm for capturing illustrated text containing halftones and photographs, but a number of issues associated with the use of this film to meet national preservation standards still await resolution. The current practice is to shoot an illustrated page twice, once to highlight the text and the second time to provide the best capture of the illustration.

One decided advantage that digital technology has over light lens processes is that a page containing both text and illustration can be captured in a manner that optimizes the reproduction of both. Text can be treated as high contrast, halftones as gray scale, and the two merged into one digital image. As noted earlier, the sample volume, *The Rede Lecture 1911*, contained halftones and line drawings embedded in text. At the time it was scanned, technicians experimented with the use of an early windowing application that is intended to treat different areas of a page, such as a halftone image, as distinct from the surrounding text, with different image processing parameters. The line art was scanned in the same manner as text, and the sample ship drawings illustrate that line art reproduces remarkably well. The rendering of halftones was less successful. As a consequence, some of the darker or lighter parts of a halftone were interpreted as text and rendered as black or white bars or squares. This phenomenon was most evident on the digital COM.

The scanning technicians have subsequently worked with new software iterations and have gained critical experience with employing a windowing function and a variety of filters, Tonal Reproduction Curve maps, and screens to capture halftones in a superior manner.

Despite the limitations of the image capture process used in preparing the digital files for *The Rede Lecture*, the digital COM offered an advantage over high-contrast film by faithfully rendering the quality of the digital version. The Micrographics EBR System 3000 reproduces digital illustrations remarkably well. Because the electron beam is extremely small, it provides exceptionally fine resolution with hard dots, sharp edges, a wide halftone range, and sharp continuous-tone imaging. This results in the quality of the output being comparable to the quality of the input, which is in marked contrast to conventional microfilming. As with text, there appears to be negligible degrading of the digital image when it is recorded to film; thus, the improved quality of halftones reproduced by windowing should translate quite faithfully to film. Yale University's proposed project to convert large quantities of preserved library materials from microfilm to digital images should provide valuable comparative data on the issue of image quality (Waters 1991; Waters and Weaver 1992).

The major distinction between digital imaging and light lens photography for halftone reproduction centers on a tradeoff between resolution and tonal reproduction. Conventional high-contrast filming is capable of achieving extremely high resolutions, but it sacrifices detail and the full range of shading. Binary scanning at 600 dpi cannot compete with conventional filming in recording fine lines, but by using a variety of software enhancements, it can pick up details often lost to shadow in high-contrast filming.

Samples of halftone printouts from the two positive films are located in appendix A. While a printout greatly degrades the image, these samples serve to illustrate the difference between digital COM and conventional filming. Note that in the conventional film representation of figure 23, much of the detail of the dynamo is lost in shadow. By comparison, the digital COM version provides superior tonal reproduction, even though the image is not as crisp as the one produced by conventional filming. This admittedly limited test suggests that the use of digital technology holds promise for producing microfilm that provides comparable text capture with better reproduction of halftones than is possible with today's conventional microfilming techniques.

Viewer perceptions of quality and resolution have been studied by Michael Ester of the Getty Art History Information Program. His study was limited to gray scale and color scanning. Similar studies for binary scanning should be conducted to compare the relative quality of binary scanning to gray scale and color scanning as well as photographic processes (Ester 1990, 51–63). As noted elsewhere, Don Willis of University Microfilms, Inc., has proposed a solution that would incorporate 600 dpi resolution with 8 levels of gray.

Of course, with digital technology the paper copy can be produced directly from the digital file and thus would not suffer the degradation introduced by the reader/printer. The draft AIIM Technical Report (TR26) *A Tutorial on Photographic and Electronic Imaging Resolution* makes the point that the requirements of the output should determine the image quality level of the individual system components. In one example involving conventional filming, the report concluded that the final output document was more than 25% lower than the least resolving component in the image chain (AIIM 1992, 9):

> We have gone from an original document that was quite legible to a retrieved document that is marginally legible, despite the fact that the resolutions for the camera, film, and reader/printer components far exceed the resolution of the original source document.

Appendix A contains samples of the same pages printed directly from the digital files by means of the Xerox Docutech. In addition to improved quality, printing on demand from the digital files will encourage use. Moreover, maintaining the digital files and making them accessible in a networked environment will lead to new methods of access not possible with microfilm or with paper. Digital technology allows for the separation of the media for preservation, duplication, access, and use. What is scanned and stored can be very different from what is printed and what is viewed on screen.

COSTS AND AVAILABILITY OF DIGITAL COM SERVICE BUREAUS

There is great potential in using digital technology to capture brittle material and to produce microfilm as a preservation backup. However, many issues remain to be resolved before this becomes a practical alternative. The first issue concerns costs and the availability of service bureaus to record the computer output microfilm. To date, Cornell knows of only one company, Image Graphics, that is prepared to offer this service. While the company's primary interest lies in marketing the Micrographics EBR System 3000, it realizes that many institutions cannot afford to purchase its system (Morgan 1992). As has been reported, Cornell experienced some concerns about the quality of the processing of the film and the use of the SO-219 film base. While both concerns could be adequately addressed by Image Graphics, or by having the processing subcontracted to another service bureau, there would be a period of adjustment and some costs associated with meeting ANSI/AIIM standards.

In a letter of December 5, 1991, Putnam Morgan, marketing manager for Image Graphics, quoted a price per book for the production of digital COM of $50 for the Kodak SO-219 and $25 for Kodak HQ Imagelink, with the price differential attributed to the cost of the film stock. Image Graphics would also have charged a one-time set-up fee of $5,000 for "non-recurring engineering and coordination" and would have preferred to convert to the use of HQ Imagelink slowly over time. These charges were based on an average of 300 pages per book and 2,400 pages per roll of film for film lengths of 120 to 125 feet. A discount price was also given for a high volume of work (1,000–2,000 volumes per month was $20; 2,000–3,000 volumes per month was $18). The per-frame charge, exclusive of the one-time fee would be close to $.17 per frame or $.083 per page.

This cost might seem high, but it should be remembered that it reflects start-up costs for a new service; the cost should come down over time. Moreover, the cost might compare favorably to the cost of converting film to digital images. Estimates for this conversion run from several cents per frame to $1.50 per page for the creation of digital images from 35mm film. The range in price might reflect additional costs associated with indexing the digital images. In addition, much of the work in film-to-digital conversion is being done for banking and financial applications and is limited to 16mm microfilm. A recent contract for converting 35mm film to 500 dpi digital images was $.35 per page.

Some of the difficulty associated with the conversion lies in dealing with two-up microfilm (two pages per frame). Software algorithms to bisect the images need to be written. In addition, if two-up filming is converted, the resolution of the individual pages could be halved; for instance, 600 dpi resolution for the frame could result in a 300 dpi page resolution. If any consideration is given to converting microfilm to digital images, it might well prove better in the long run to begin microfilming material with one image per frame rather than the more traditional two images per frame (Demas 1992). Nonetheless, if the only goal is to produce preservation microfilm at two images per frame, conventional micrographics continues to be cheaper than using digital technology. On the other hand, if the goal is to enhance access and use while also creating a preservation master, scanning first could be less expensive than filming first.

CONCLUSION

Cornell believes that preservation quality microfilm can be produced from 600 dpi scanning and recommends that this option—including costs, vendor relations, and large-scale conversion—continue to be explored. Cornell had initially considered converting a large number of digital books to microfilm in 1992 but decided against this for several reasons, the primary one being a considerable delay in the development of the document structure software that will be required for merging microfilm targets with digital page images and for reel programming. The document editing software has recently become available from Xerox Corporation. Additional software programming will be required to extend it to cover the merging of digital images with the requisite targets and to create microfilm reel contents. A proposal to conduct a digital-to-microfilm demonstration project has been submitted to a federal funding agency.

Cornell also recommends that distinct definitions of quality be developed for the use of digital technology as a preservation alternative. Today, quality control for image scanning is defined in terms of each scanning system's capabilities and how well it performs. There are no objective requirements analogous to those set for creating preservation microfilm. As has been seen, micrographics standards define acceptable film in terms of resolution and density, but they do not provide a means for evaluating the quality of captured illustrations, in particular halftones and photographs. Furthermore, these standards are not totally transferrable to digitally produced microfilm, as the problems of using resolution test patterns attest. Second, film density is a software-controlled variable in the production of digital COM and might have less bearing on the image quality than it does in conventional microfilming. Third, micrographics standards are based on defining quality for the preservation copy (film) and not the use copy (paper). This is problematic given the degradation caused by converting from film to paper via a reader/printer. Fourth, unlike micrographics, quality standards for digitally captured material could vary according to the type of document being scanned (gray scale versus binary) and the medium of the use copy (paper, film, on-screen image).

Finally, Cornell recommends that draft-quality standards for digital technology be developed by a group of experts from a variety of disciplines, including preservation administration, micrographics, photography, image science, digital technology, the standards-setting field, and research scholars. This group should develop shared definitions of quality for digitally produced copies—including paper, film, and on-screen display—and should present them to the broader library preservation community for review, modification, and adoption. These definitions would assist in the knowledgeable use of digital technology as a means to preserve and make available deteriorating library materials.

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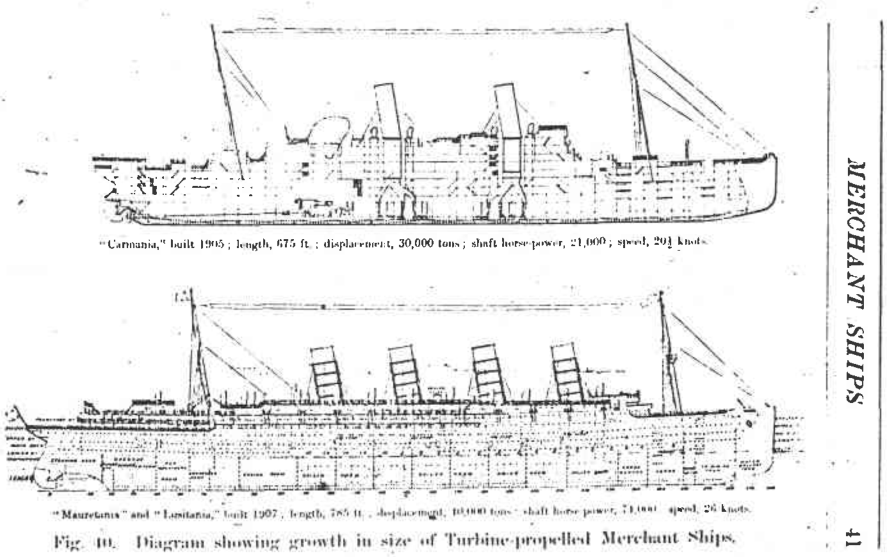
APPENDIX A

Samples of Film Printouts and Direct Digital Printing



"Carmania," built 1905 ; length, 675 ft. ; displacement, 30,000 tons ; shaft horse-power, 21,000 ; speed, 20½ knots.

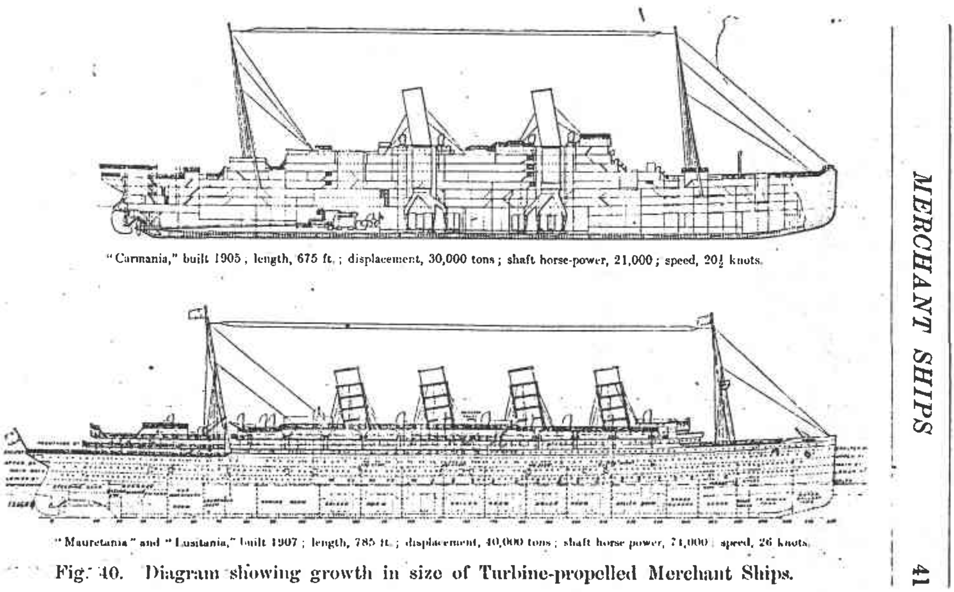
"Mauretania" and "Lusitania," built 1907 ; length, 785 ft. ; displacement, 40,000 tons ; shaft horse-power, 70,000 ; speed, 26 knots.

Fig. 10. Diagram showing growth in size of Turbine-propelled Merchant Ships.

MERCHANT SHIPS

41

Film Printout from Conventional Film.



"Carmania," built 1905; length, 675 ft.; displacement, 30,000 tons; shaft horse-power, 21,000; speed, 20½ knots.

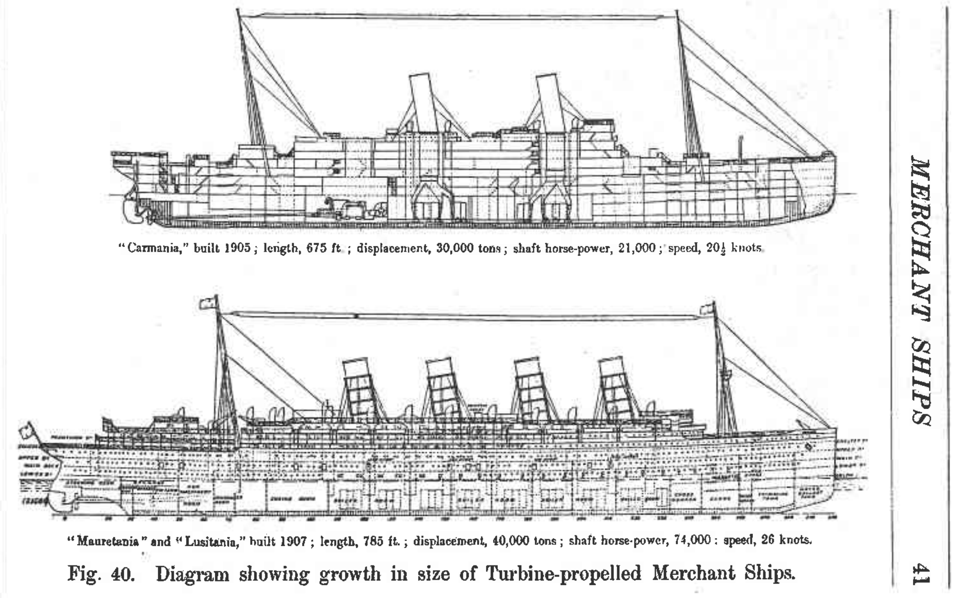
"Mauretania" and "Lusitania," built 1907; length, 785 ft.; displacement, 40,000 tons; shaft horse-power, 74,000; speed, 26 knots.

Fig. 40. Diagram showing growth in size of Turbine-propelled Merchant Ships.

MERCHANT SHIPS

41

Film Printout from Raster COM.



"Carmania," built 1905; length, 675 ft.; displacement, 30,000 tons; shaft horse-power, 21,000; speed, 20½ knots.

"Mauretania" and "Lusitania," built 1907; length, 785 ft.; displacement, 40,000 tons; shaft horse-power, 74,000; speed, 26 knots.

Fig. 40. Diagram showing growth in size of Turbine-propelled Merchant Ships.

MERCHANT SHIPS

41

Printed Directly from Digital Image.

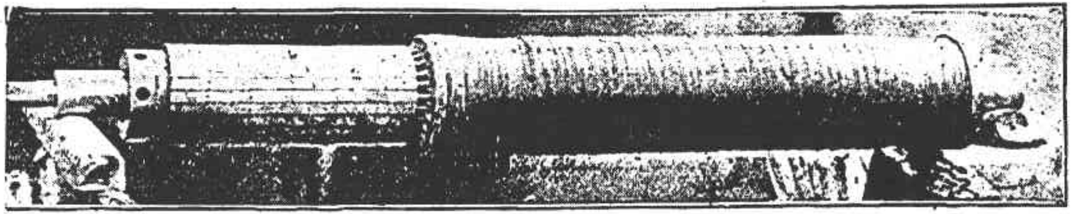


Fig. 23.

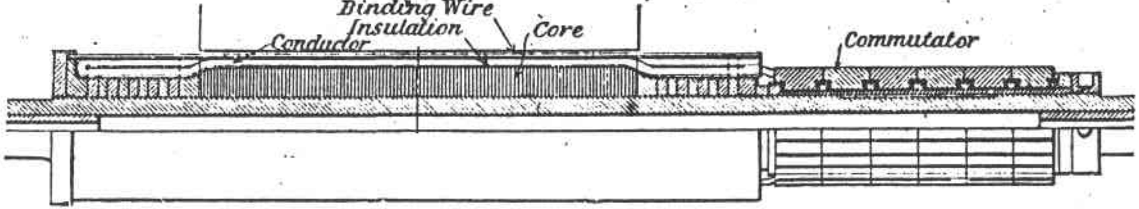


Fig. 24 *a.*

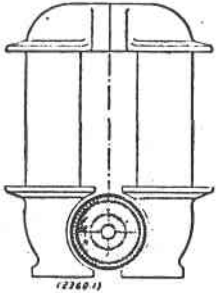


Fig. 24 *b.*

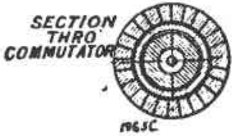


Fig. 25.

Figs. 23 to 25. Dynamo of 1884, driven by First Turbine.

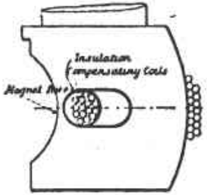


Fig. 26. Compensating Winding made in 1885.

Figs. 23 to 26. Early Turbine-Driven Electric-Generator.

from 80,000 to 120,000 or more. With the first figure a loss of efficiency of about 10 per cent. below the highest attainable is accepted, and with the latter figure the deficit is only about 3 per cent.

The construction of a suitable dynamo to run with the turbine involved nearly as much trouble as the turbine itself: the chief features were the adoption of very low magnetic densities in the armature core and small diameters and means to resist the great centrifugal forces as shown in the views on page 18. The dynamo was also mounted in elastic bearings. Now that the turbine has found its most suitable field in large powers to which we always looked forward and as the speed of revolution has been consequently reduced, elasticity in the bearings is less essential, and in large land plants and in marine work rigid bearings are universal.

There are many forms of turbines on the market. It is only necessary, however, for us here to consider the four chief types which are:—

Printout from Conventional Film.

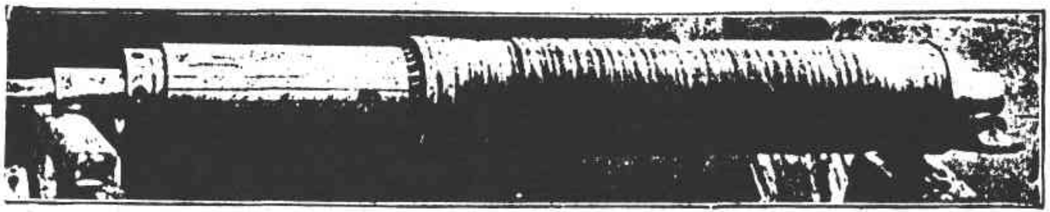


Fig. 23.

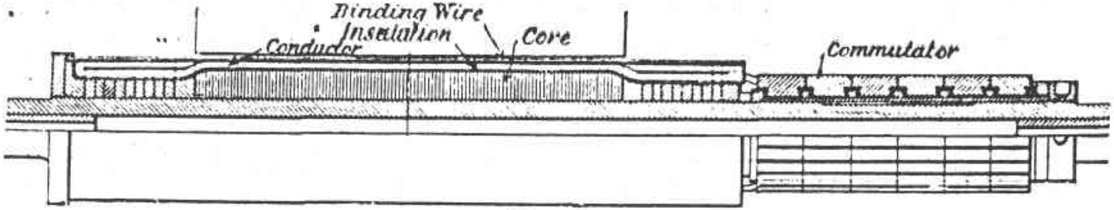


Fig. 24 a.

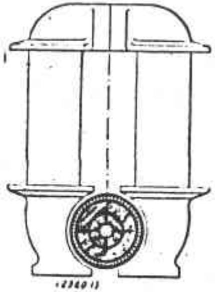


Fig. 24 b.

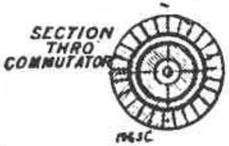


Fig. 25.

Figs. 23 to 25. Dynamo of 1884, driven by First Turbine.

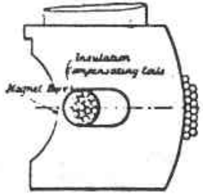


Fig. 26. Compensating Winding made in 1885.

Figs. 23 to 26. Early Turbine-Driven Electric-Generator.

from 80,000 to 120,000 or more. With the first figure a loss of efficiency of about 10 per cent. below the highest attainable is accepted, and with the latter figure the deficit is only about 3 per cent.

The construction of a suitable dynamo to run with the turbine involved nearly as much trouble as the turbine itself: the chief features were the adoption of very low magnetic densities in the armature core and small diameters and means to resist the great centrifugal forces as shown in the views on page 18. The dynamo was also mounted in elastic bearings. Now that the turbine has found its most suitable field in large powers to which we always looked forward and as the speed of revolution has been consequently reduced, elasticity in the bearings is less essential, and in large land plants and in marine work rigid bearings are universal.

There are many forms of turbines on the market. It is only necessary, however, for us here to consider the four chief types which are:—

2—2

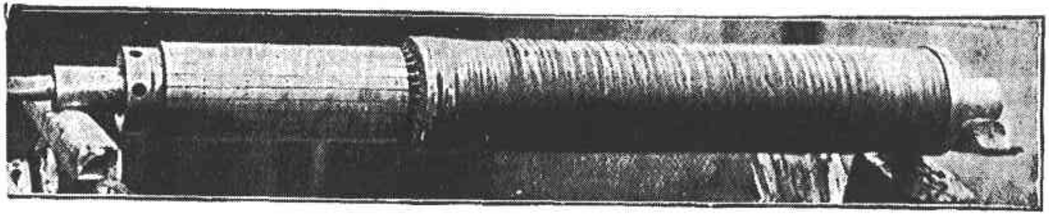


Fig. 23.

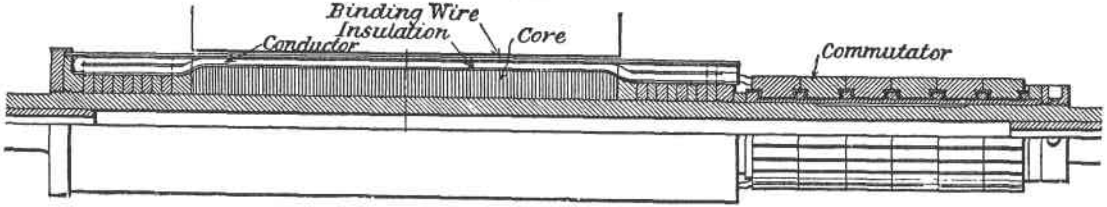


Fig. 24 *a*.

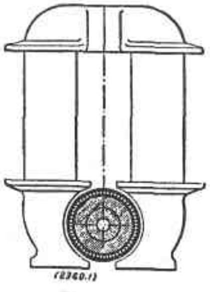


Fig. 24 *b*.

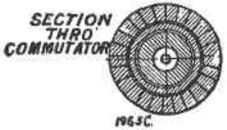


Fig. 25.

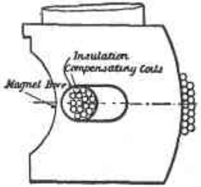


Fig. 26. Compensating Winding made in 1885.

Figs. 23 to 25. Dynamo of 1884, driven by First Turbine.

Figs. 23 to 26. Early Turbine-Driven Electric-Generator.

from 80,000 to 120,000 or more. With the first figure a loss of efficiency of about 10 per cent. below the highest attainable is accepted, and with the latter figure the deficit is only about 3 per cent.

The construction of a suitable dynamo to run with the turbine involved nearly as much trouble as the turbine itself: the chief features were the adoption of very low magnetic densities in the armature core and small diameters and means to resist the great centrifugal forces as shown in the views on page 18. The dynamo was also mounted in elastic bearings. Now that the turbine has found its most suitable field in large powers to which we always looked forward and as the speed of revolution has been consequently reduced, elasticity in the bearings is less essential, and in large land plants and in marine work rigid bearings are universal.

There are many forms of turbines on the market. It is only necessary, however, for us here to consider the four chief types which are:—

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ALCTS

Linking Successive Entries Based upon the OCLC Control Number, ISSN, or LCCN

Robert Alan

The feasibility of using machine links based upon the presence of standard record control numbers in linking entries to cluster successive-entry serial bibliographic records was studied. Two potential scenarios were considered for clustering serial successive entries in a database of predominantly CONSER authenticated records. A sample of 400 title changes was studied to determine the occurrences of OCLC control numbers, ISSNs, and LCCNs in linking fields. In all, 71.29% of title-change record sets would be linked if an approach is used that takes into account the presence of all of any one of the types of standard record control numbers in the required linking fields.

Title changes are a significant characteristic of serials. Blixrud (1988) reported that during the course of a year an average of 15% of the National Serials Data Program (NSDP) prepublication records represented title changes. Statistics for the entire Cooperative Online Serials Program (CONSER) file indicated that approximately 31% of records had a linking 780 field and 25% a 785 field. Although the statistics presented by Blixrud do not preclude a single record from having more than one occurrence of a linking field, a significant segment of the CONSER file has experienced a change of entry. Tillett (1992) reported that 47% of serial records (151,793) in the 1968–July 1976 Library of Congress machine-readable database contained linking 78X fields other than those for absorbed titles. Effective access to such a significant segment of the total serial population requires further examination.

The handling of serial title changes in the catalog has varied over the years. Serial cataloging standards have evolved from earliest-entry to latest-entry to the current standard of successive entry, based upon the earliest issue.

Sanctioned by both the *Anglo-American Cataloging Rules (AACR)* and *Anglo-American Cataloguing Rules*, 2nd edition,

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ROBERT ALAN is Head, Serials Department, Shields Library, University of California, Davis. The author gratefully acknowledges the encouragement and assistance of the CONSER Policy Committee: Linda Bartley, CONSER Operations Coordinator; Julia Blixrud, formerly Head, National Serials Data Program; John Levy, Serial Record Division; John Graves and Ardie Bausenback of the Automation Planning & Liaison Office, Library of Congress; Crystal Graham, Latin American Studies Cataloger, Catalog Department, University of California, San Diego; Melissa Beck, Head of Serials Cataloging, and Ron Watson, CONSER Coordinator, Cataloging Department, University of California, Los Angeles. This project was supported by a grant from the Librarians Association of the University of California, San Diego. Manuscript submitted April 12, 1993; accepted for publication May 21, 1993.

1988 Revision *(AACR2R)*, the current standard of successive-entry cataloging requires the creation of separate bibliographic records for each change of entry. The successive-entry records are linked by use of United States Machine-Readable Cataloging (USMARC) 780 fields to the preceding entry and 785 fields to the succeeding entry. Automated systems have the capability of indexing the linking fields.

The 1949 *ALA Cataloging Rules for Author and Title Entries* sanctioned latest-entry cataloging based upon the latest manifestation of the title, with earlier serial entries appearing in *title varies* notes in the 247 field. The 247 field can also be indexed in automated systems.

Latest entry was preceded by earliest-entry cataloging. Rule 121 of the 1908 *Catalog Rules, Author and Title Entries,* states that the Library Association sanctioned use of a single bibliographic record based upon the earliest manifestation of the serial publication. Later titles are added to the base record as *title varies* notes.

The development of automated retrieval systems and the migration from card to online catalogs have fueled the debate over the advantages and disadvantages of each cataloging standard. Northwestern University Library selectively adopted a form of latest-entry cataloging to overcome certain problems encountered in its integrated online system caused by the scattering of bibliographic, acquisitions, holdings, and circulation data for serials that have changed entry and were split into multiple successive entries. Cole (1986), Zajanc (1986), and Lim (1986) urge the use of a single bibliographic record to minimize the workload involved with recataloging title changes. The updating of a single record is far less costly than creating successive-entry bibliographic records each time a serial changes entry.

Conversely, successive entry offers simplicity for description of complicated materials. Successive entry is a standard that can be applied uniformly to all types of serial entry changes, regardless of the level of complexity. While at Northwestern latest entry was implemented to overcome the scattering of associated order, holdings, and circulation records in the online catalog, Bernhardt (1988) points out that successive-entry cataloging might in fact best serve the complex processing requirements for serials. The attachment of order, receipt, holdings, and circulation information for multiple serial entries to one record can lead to confusion. It would be far more difficult to rely upon a single bibliographic record to support multiple, complex title changes than to break out into separate successive entries.

Supporters of earliest and latest entry contend that those standards provide the most efficient access to the entire publication history of a serial. By virtue of indexing earlier and later serial entries in a single bibliographic record, the user is provided with one-stop shopping. However, Bernhardt argues that when searching a title that has been cataloged using latest entry, "a user may retrieve a record for a completely different title than the one searched and not recognize it as the same serial." The catalog user must be relied upon to read and interpret the record to determine whether the desired serial title has been retrieved. This might be even more troubling if entry changes are complex and numerous.

It can also be argued that successive-entry cataloging does not currently provide efficient access in the online catalog. Tillett (1991) states that the preferred method of linking successive-entry records is the use of linked added entries to the immediately preceding and succeeding entries in the sequence. Indexing of the preceding and succeeding entries will retrieve only a set of bibliographic records that, at best, would include two or three records in a sequence of entry changes. Complex serial title changes that include more than three successive-entry records require multiple searches to retrieve all bibliographic records in the sequence.

Online systems have the capability of indexing 780 and 785 fields. Arguments can be made against indexing the linking fields because of the confusion that can result when multiple records are retrieved that might or might not be related to the serial being searched. As a result, many choose not to index the linking fields in their local systems and rely upon linking notes embedded within the bibliographic record to lead catalog users to the preceding or succeeding entry.

Leazer (1992) comments that although the USMARC format provides for an automatic mechanism for linking multiple bibliographic records via linking fields, natural language headings and notes are used primarily to provide linkages to related records. He urges more thought be given to expressing effectively the relationships of linked bibliographic records in an automated environment.

The purpose of this article is not to debate fully the virtues of the associated serials cataloging practices but to explore the possibility of using machine links to provide efficient access to serial title changes. Rather than readopting latest-entry or earliest-entry cataloging, time would be better spent investigating methods of using automation to provide efficient access to serial title changes, while at the same time preserving the concept of successive entry.

BACKGROUND

Bernhardt (1988) developed a model for creating meaningful screen displays for serial title changes. The model programmatically clusters successive entries based upon the presence of local system record control numbers in the 780 and 785 fields of the bibliographic record. She presented possible screen displays that would provide the main entry (title proper) and either numeric/chronologic designation or a holdings statement field for each change of entry for a serial in one screen display. Bernhardt's approach provides for efficient access to the bibliographic and holdings information for serial title changes.

While Bernhardt proposed using a local system record control number, would it not be more advantageous to consider using existing linking numbers in an environment of shared systems as opposed to creating separate links over and over again on each local system? What is the feasibility of using either the OCLC Online Computer Library Center, Inc. control number, International Standard Serials Number (ISSN), or Library of Congress control number (LCCN) to cluster records? The USMARC format provides the necessary linking fields and subfielding to develop a programmatic approach as proposed by Bernhardt for clustering serial title changes. However, clustering is still dependent upon the presence of linking numbers in each bibliographic record.

EXTENDING BERNHARDT'S MODEL

To extend the work of Bernhardt by determining the feasibility of linking multiple successive entries based upon the presence of standard record control numbers in the linking 780 and 785 fields, the study reported here was designed. The proposed matching algorithms are based upon the presence of a bibliographic record for each successive change of entry, each of which contains 780 or 785 field(s) and a linking number that corresponds to the number appearing in either the 001 (OCLC control number), 010 (LC control number), or 022 (ISSN).

001 = 780/785 ǂw OCoLC
010 ǂa = 780/785 ǂw DLC
022 ǂa = 780/785 ǂx ISSN

Matching based upon text strings was not considered. Coyle (1985) points out that a machine algorithm has much less inferential ability when faced with ambiguous or conflicting data. Variations in text strings in the 780 and 785 fields cannot be efficiently accommodated by machine matching. Inconsistencies may be the result of varying cataloging codes, practices, or errors in data entry.

In the example in figure 1, the OCLC control number appearing in subfield ǂw was used. The linking number points to the 001 with the same OCLC control number. Therefore, if Journal D is searched, the proposed linking program searches for any 780 or 785 fields. If found, the program then searches for subfield ǂw with the prefix "OCoLC." And, if found, the OCLC control number is searched against the 001s for a matching number. In turn, the OCLC control numbers in subfield ǂw of the 780 and 785 fields of Journal B point to the 001s with matching numbers. The

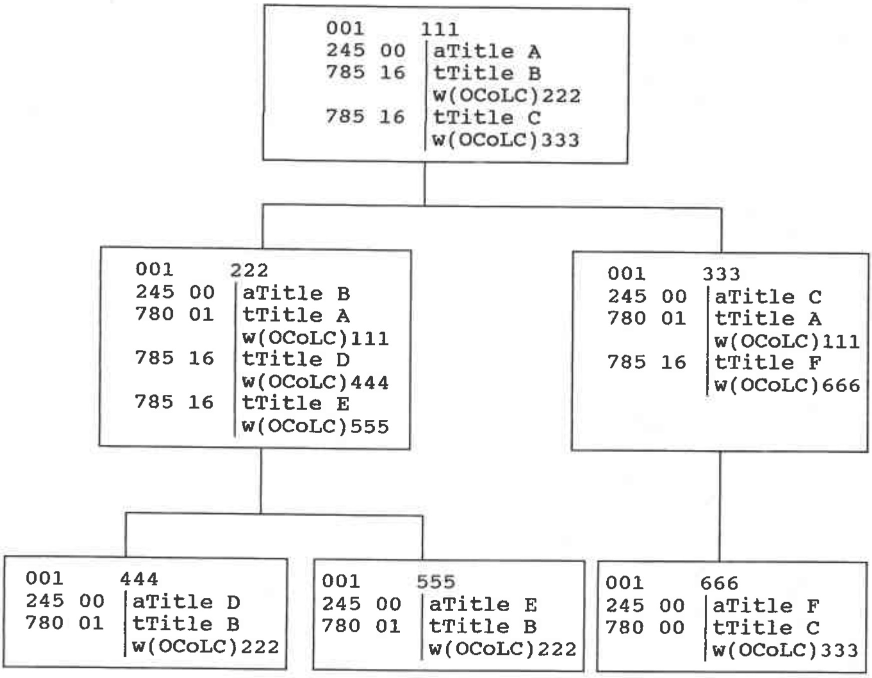


Figure 1. Schematic of Title Change Linking Relationship.

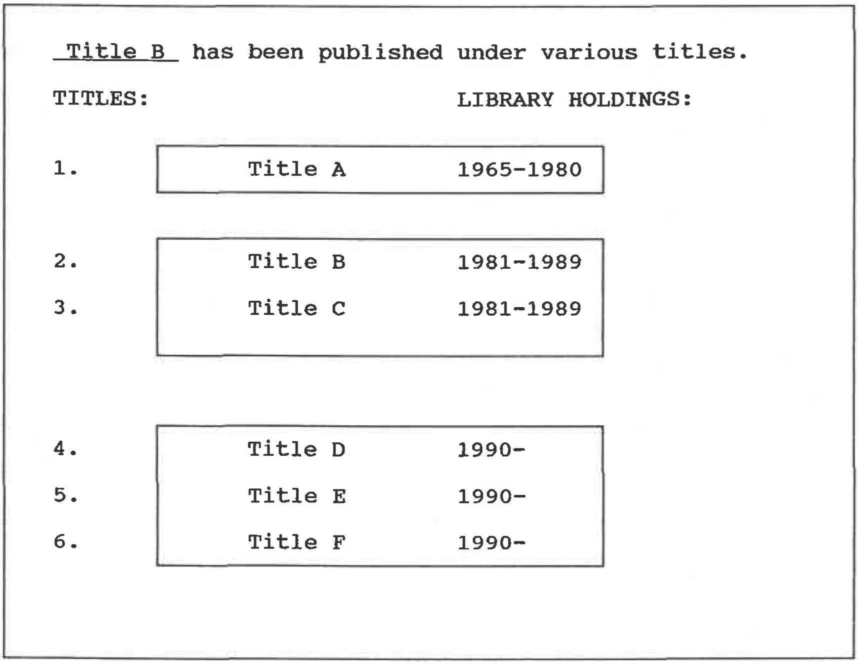
program continues clustering entries until all OCLC control numbers appearing in subfield ‡w have been searched against the 001s.

Based upon Bernhardt's model and proposed screen designs, a search by one entry in a title-change record set would result in a screen that displays a cluster of all related linked records in sequential order (see figure 2).

In the previous example, the OCLC control number was used to link the bibliographic records. The ISSN or LCCN also could be used. The advantage of using the OCLC control number is that the number is system generated and unique and will always be present in the 001 field of the OCLC records. However, the OCLC control number must still be correctly entered in subfield ‡w of the 780 or 785 field(s). The ISSN and LCCN must be assigned and correctly entered in the 022 and 010 fields as well as subfields ‡x and ‡w of the linking 780 and 785 fields.

Two potential approaches to linking serial title changes were examined. The first approach is dependent upon the presence of a specific linking number type in all linking fields in a set of successive-entry bibliographic records. The program might look only for the OCLC control number and ignore the ISSN and LCCN. Conversely, the program might look only for the ISSN and ignore the presence of the OCLC control number and LCCN. What percentage of records for serial title changes are linked based upon the presence of the OCLC control number, or the ISSN, or the LCCN? If this approach were adopted, which linking number would be preferred based upon the occurrence of that number as opposed to other linking numbers?

The second approach is based upon a hierarchy, which is dependent upon the presence of all the OCLC control numbers, ISSNs, or LCCNs in the linking fields in a set of successive-entry bibliographic



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 Title B  has been published under various titles.

TITLES:                        LIBRARY HOLDINGS:

1.         Title A          1965-1980

2.         Title B          1981-1989
3.         Title C          1981-1989

4.         Title D          1990-
5.         Title E          1990-
6.         Title F          1990-
```

Figure 2. Possible Screen Display.

records. The program would first look for the linking number type that had the highest probability of linking all successive-entry records. For example, if the OCLC control number had the highest probability of correctly appearing in the linking fields of all records, the program would first search for subfield ‡w. As with the first approach, the OCLC control numbers appearing in linking fields are matched against the 001s. If the linking 780 and 785 fields lack an OCLC control number that matches an 001, but an ISSN or LCCN is present, the program would then start over and search by the next linking number in the hierarchy. If the next number was the LCCN, but the LCCN did not appear in the linking field, the ISSN appearing in subfield ‡x would be searched. If either this number did not appear in subfield ‡x of the linking field or did not appear in an 022 of a linked bibliographic record, the search would fail and, at best, only a partial cluster would occur. It was assumed that there would be more title changes linked by using all three types of linking numbers than by depending on only one type.

The advantage of the second approach is the higher probability of the occurrence of all of at least one type of linking number in each linking entry of a title-change record set. A disadvantage would be the complexity of the linking program.

The study reported here was designed to test the feasibility of both approaches by measuring the occurrence of linking fields and linking numbers in sets of successive-entry serial bibliographic records in the OCLC Online Union Catalog.

METHODOLOGY

To accomplish the objective of the study, serial title changes were analyzed in the Online Union Catalog. For purposes of the study, serial title changes were defined as any change of main entry or title proper that resulted in the presence of 780 or 785 fields in a serial bibliographic record.

Samples were drawn from the subset of the Online Union Catalog that constitutes the CONSER authenticated records, designated by the presence of an 042 field containing codes that signify that records are in conformance with CONSER standards and practices. The sample records provided access to sets of linked successive-entry records. From the outset, there was an expectation that the majority of the sample records would be linked to other CONSER authenticated records, thus yielding results that would be more reflective of the CONSER subset than the entire Online Union Catalog.

The Library of Congress supplied random samples from the CONSER database. The minimum sample size was calculated to be 362 records using the formula

$$n = \frac{z^2}{e^2} p(1-p)$$

where "e" is the error level of precision, "z" represents a 95% confidence interval, and "p" the probability that a title change will cluster based upon the presence of at least one type of record control number in all linking fields of a title-change record set, or based upon a small test sample.

After consultation with staff at the Library of Congress, two distinct samples of 400 records were drawn from a subset of the CONSER file on January 22, 1991. The samples consisted of 400 CONSER authenticated serial bibliographic records that had either a 780 or 785 field. Each of the 400 records was considered to be a separate title change due to the presence of either a 780 or 785 field. The 780 and 785 fields in one of the two samples were searched on OCLC by linking numbers, if present. If linking numbers did not appear in a 780 or 785 field, the linking author-title entry was searched. The process continued until all 780s or 785s appearing in the records had been searched.

The results of the initial sample were not what was expected. A significant proportion of the records (31.25%) represented records authenticated by participants in the U.S. Newspaper Program. Further consultation with Library of Congress staff indicated that the percentage of serial bibliographic records coded as newspapers retrieved in the study was significantly higher than the proportion in the entire CONSER database. The newspapers were primarily linked by LCCN, which had a significant impact on the overall results of the study. It was decided that additional samples would be required that would be more reflective of the entire serial file.

The Library of Congress provided additional random samples drawn from the CONSER file on June 17, 1991. This time, two distinct random samples were drawn that segregated newspapers from non-newspapers. The sample used in this study consisted of 400 non-newspaper bibliographic records randomly drawn from a subset (184,403 bibliographic records) of the CONSER file that included all records with either a linking 780 or 785 field that were coded as successive-entry records and not coded as newspapers. The second sample of newspaper records will be considered at a future date.

For each of the 400 title-change record sets, the following information was recorded on a summary data sheet: total number of bibliographic records retrieved; presence or lack of necessary 780 or 785 fields; and the presence or lack of correct linking OCLC, ISSN, and LCCN numbers. Each title-change record set, consisting of bibliographic records with 780 and 785 fields, was examined to determine whether the records within the set were either CONSER authenticated or unauthenticated. Upon completion of the review of retrievable records comprising each of the 400 title-change record sets, a determination was made whether the set was correctly linked by OCLC, ISSN, and LCCN numbers.

RESULTS

The 400 title-change record sets resulted in a total of 1,629 successive-entry records being retrieved on OCLC for a mean of 4.07 retrievable bibliographic records per set. The range of the distribution varied from 1 to 32 retrievable successive-entry records per set (see table 1). Although the

TABLE 1

RANGE AND FREQUENCY OF BIBLIOGRAPHIC RECORDS RETRIEVED PER TITLE-CHANGE RECORD SET (N=400)

No. Records per Title-Change Record Set	Frequency	No. Records per Title-Change Record Set	Frequency
1	3	10	3
2	146	11	6
3	102	12	1
4	55	13	2
5	28	18	4
6	15	19	3
7	15	23	2
8	9	24	1
9	4	32	1

Mean = 4.07.
Standard deviation = 3.6.

TABLE 2

OCCURRENCE OF AUTHENTICATED RECORDS (N=1,629)

CONSER Authentication	No.	%
Authenticated	1,514	92.94*
Unauthenticated	11	57.10

95% confidence interval = ± 1.24%.

distribution shows that a larger proportion of title-change record sets had the fewer number of retrievable records, 23.5% of the sets consisted of record totals that exceeded the mean of 4.07.

The overwhelming majority of records retrieved were CONSER authenticated, as 92.94% were authenticated and 57.1% were unauthenticated (see table 2). Of the authenticated records, 97.23% (1,472) had either an encoding level of "blank" or "I," and 2.77% (42) had an encoding level of "7." There was an expectation that the overall quality of the records was high based upon such a large proportion of the records being authenticated. Therefore, the results of the study were more reflective of a database of CONSER authenticated serials than the entire Online Union Catalog of authenticated and unauthenticated serial bibliographic records.

Each of the 1,629 bibliographic records retrieved on OCLC was reviewed for the presence of 780 and 785 fields. The 1,629 records had a total of 1,198 linking 780 and 1,311 linking 785 fields present for a mean of 1.54 linking fields per record or a mean of 6.27 linking 780 and 785 fields per title-change record set. Of the total of 2,509 linking fields, 1.08% (27) were linked to bibliographic records that were not present on OCLC. In each case, the 27 linking entries were to the earliest occurrences in the sequence of successive entries. Therefore, of the 2,509 linking entries, 98.92% (2,482) were linked to bibliographic records retrieved on OCLC.

Of the 400 title-change record sets, 3 of the sets consisted of a single successive entry linked to a preceding serial entry not yet present in the Online Union Catalog (see table 1). Therefore, 397 of the original sample of 400 title-change record sets had 2 or more records that required linking numbers to cluster successive-entry records. The remaining 397 title-change record sets, comprising 1,626 successive-entry records containing 2,482 linking fields to records appearing in the Online Union Catalog, were reviewed to determine whether all of the OCLC, ISSN, and LCCN links were in place for each of the sets.

The linking numbers were checked for accuracy against the corresponding 001, 010, and 022 fields in each of the linked bibliographic records. Again, a linking number was considered to be correct if the number appearing in subfield ‡x or ‡w of the linking 780 and 785 fields corresponded to the number present in the 001 (OCLC control number), 022 subfield ‡a (ISSN), or 010 subfield ‡a (LCCN). Table 3 presents the number of occurrences of each type of record control number in the 2,482 linking fields of the 1,626 records retrieved, which comprise the 397 title-change record sets. The OCLC control number (66.56%) and the LCCN (52.86%) appeared correctly in the majority of records retrieved, while the ISSN correctly appeared in only 34.13% of all records retrieved. In all cases, the error rate was below 1% for those linking numbers that were present in the linking fields.

TABLE 3

OCCURRENCES OF LINKING NUMBERS IN ALL LINKING ENTRIES (N=2,482)

Type of Linking Number	Correct Linking Numbers	%	Incorrect Linking Numbers	%	Lacks Linking Number	%*
OCLC	1,652	66.56*	10	.40	820	33.04
LCCN	1,312	52.86†	13	.52	1,157	46.62
ISSN	847	34.13†	11	.44	1,624	65.43

N = 2,482 linking 780 and 785 fields in 397 title-change record sets with 2 or more bibliographic records.
*95% confidence interval = ± 1.86%.
†95% confidence interval = ± 1.96%.

When records did not have the correct linking number in place, the cause was the OCLC control number, ISSN, or LCCN not being entered into the appropriate subfield of the linking 780 and 785 fields. In all cases, at least one type of linking number was available in the records. The OCLC control number was available in all records retrieved, and the ISSN and LCCN were available in more than 90% of the records retrieved.

MODEL ONE: MATCHING ALGORITHM BASED UPON PRESENCE OF ONE TYPE OF LINKING NUMBER

For a title-change record set to be linked correctly, all of one type, but only one type, of record control number must be present in the corresponding linking fields. The results were not encouraging (see table 4). While the correct OCLC control number appeared in 66.56% of the corresponding linking fields in all records retrieved (see table 3), only 43.07% of the title-change record sets with 2 or more retrievable records had all of the OCLC control numbers in the 001 and the corresponding subfield ǂw of the 780 and 785 fields. Both the LCCN (38.54%) and ISSN (26.7%) experienced a similar, although not as significant, change in the number of correct linking numbers appearing in all of the retrieved records versus the number of record sets that were correctly linked by either of those record control numbers. The low percentage of title-change record sets linked can again be attributed directly to the appropriate record control numbers not being entered in the linking 780 and 785 fields, not to the numbers being unavailable in the unlinked records.

When analyzing each of the title-change record sets that were correctly linked by at least one type of linking number, it becomes apparent why dependence upon one type, and only one type, of linking number for a machine match yielded such a low success rate. Table 5 presents the breakdown of each of the title-change record sets that were linked correctly by one or more types of linking number. It is interesting to note that while the ISSN correctly appeared in only 34.13% of all linking entries, that linking number type was solely responsible for correctly linking 16.37% of the title-change record sets, exceeding the number of sets solely linked by either the OCLC or LCCN. This category of title-change record sets primarily included records coded as part of the International Serials Data System (ISDS) database.

MODEL TWO: MATCHING ALGORITHM BASED ON HIERARCHY OF ALL LINKING NUMBER TYPES

For a title-change record set to be linked correctly, all of one type, but any one type, of record control number must be present in the corresponding linking fields. The results were far more encouraging when the matching algorithm relied upon the presence of all of at least one type of record control number, as 71.29% were correctly linked by this approach. Table 6 shows the success rate if combinations of any two or all three types of linking numbers are used.

The 114 title-change record sets that did not link (28.71%) lacked all of at least one type of record control number in the linking 780 and 785 fields. Again, linking 780 and 785 fields that lacked any record

TABLE 4

TITLE-CHANGE RECORD SETS CORRECTLY LINKED (N=397)

Linking Number Type	No. of Title-Change Record Sets Correctly Linked	%	95% Confidence Interval
OCLC	171	43.07	± 4.87%
LCCN	153	38.54	± 4.79%
ISSN	106	26.70	± 4.35%

N = 397 title-change record sets with 2 or more bibliographic records.

TABLE 5

TITLE-CHANGE RECORD SETS LINKED BY ONE OR MORE LINKING NUMBER (N=397)

Linking Number Types	No. of Title-Change Record Sets Correctly Linked	%	95% Confidence Interval
OCLC & LCCN	85	21.41	± 4.03%
ISSN only	65	16.37	± 3.64%
OCLC only	55	13.85	± 3.40%
LCCN only	37	9.32	± 2.86%
OCLC & ISSN & LCCN	26	6.55	± 2.43%
OCLC & ISSN	10	2.52	± 1.54%
ISSN & LCCN	5	1.26	± 1.10%

N = 397 title-change records sets with 2 or more bibliographic records.

TABLE 6

TITLE-CHANGE RECORD SETS LINKED BY MORE THAN ONE TYPE OF LINKING NUMBER (N=397)

Linking Number Types	No. of Title-Change Record Sets Correctly Linked	%	95% Confidence Interval
OCLC or LCCN or ISSN	283	71.29	± 4.45%
OCLC or LCCN	246	61.97	± 4.78%
ISSN or LCCN	228	57.43	± 4.86%
OCLC or ISSN	218	54.91	± 4.89%

N = 397 title-change record sets with 2 or more bibliographic records.

TABLE 7

OCCURRENCES OF RECORDS IN LINKED AND UNLINKED RECORD SETS

Categories	No.	Mean	Std. Dev.	Range
All title-change record sets (*N* = 400)	1,629	4.07	3.60	1–32
Linked title-change record sets (*N* = 283)	993*	3.51	1.92	2–19
Unlinked title-change record sets (*N* = 114)	633*	5.55	6.52	2–32

*Does not total 1,629 due to exclusion of 3 title-change record sets consisting of 1 successive entry record.

control numbers were searched by the linking entries present in those fields to determine whether the linked entries appeared in the Online Union Catalog.

The characteristics of the unlinked title-change record sets differed from the overall population and the linked sets. The 114 unlinked sets comprised a total of 633 successive entries for a mean of 5.55 bibliographic records per set compared to 4.07 for the total population and 3.51 for the linked sets (see table 7). The 633 bibliographic records for the unlinked title-change record sets had a total of 542 linking 780 fields and 625 linking 785 fields present in the records for a mean of 1.84 linking fields per record or a mean of 10.24 linking fields per title-change record set (see table 8). The average number of linking fields per record for the entire sample was 1.54 or a mean of 6.27 per title-change record set, whereas the mean for the 283 linked title-change record sets was 1.35 linking entries per record or a mean of 4.73 per title-change record set. Therefore, the 114 title-change record sets that could not cluster because of a lack of at least one type of record control number in the linking fields (28.5% of the total number of title changes) accounted for 46.51% of the total number of linking fields present.

Of the 633 bibliographic records for the unlinked title-change sets, 13.43% (85) were unauthenticated. Only 7.1% (115) of the total number of records retrieved for the entire sample were unauthenticated.

TABLE 8

OCCURRENCES OF LINKING 780 AND 785 FIELDS

	No.	Mean	Std. Dev.	Range
Linking Entries per Record				
All title-change record sets (N = 1,629)	2,509	1.54	0.67	1–7
Linked title-change record sets (N = 993)	1,339*	1.35	0.63	2–5
Unlinked title-change record sets (N = 633)	1,167*	1.84	1.19	2–14
Linking Entries per Title-Change Record Set				
All title-change record sets (N = 400)	2,509	6.27	10.98	1–105
Linked title-change record sets (N = 283)	1,339*	4.73	4.34	2–27
Unlinked title-change record sets (N = 114)	1,167*	10.24	16.48	2–105

*Does not total 2,509 due to exclusion of 3 linking entries appearing in 3 title-change record sets consisting of 1 successive entry record.

Fourteen of the total of 114 unlinked title-change record sets lacked any record control numbers in the linking 780 and 785 fields. Therefore, 96.47% (383) of the title-change record sets with links to more than one record available on OCLC had at least some of the linking numbers in place. Table 9 contains the occurrences of linking numbers for the 114 unlinked title changes.

CONCLUSIONS AND RECOMMENDATIONS

These data indicate that in a database of predominantly CONSER authenticated records of non-newspapers, 71.29% of title-change record sets would be linked if an approach is used that takes into account the presence of all of any one of the types of standard record control numbers in the required linking fields. A matching algorithm based upon only one type of record control number would result in fewer than half of the title-change record sets being linked.

To link correctly all of the title-change record sets would entail the addition of linking numbers to at least some of the linking entries present in 28.72% of title-change record sets. Results indicate that the most feasible approach would be to adopt a linking algorithm that would take advantage of the presence of all of the record control numbers. The addition of the OCLC control number to the linking entries of the unlinked title changes would be the most expedient way to cluster, by identification number, all of the title-change record sets.

The foundation for developing machine links based upon standard record control numbers is in place. Results from this study showed that there were no gaps of linked bibliographic records in each of the 400 sequences of successive-entry title-change record sets. The linking 780 and 785 fields were present in the records. In all cases, at least one of the three standard record control numbers was available

TABLE 9

OCCURRENCES OF LINKING NUMBERS IN UNLINKED TITLE-CHANGE RECORD SETS (N=1,167)

Linking Number Type	Linking Entries with Number	%	Linking Entries with Incorrect Number	%	Lacks Linking Numbers	%
OCLC	592	50.73*	10	0.86	565	48.42
ISSN	513	43.96†	11	0.94	643	55.10
LCCN	436	37.36‡	13	1.11	718	61.53

N = 1,167 linking entries in 114 unlinked title-change record sets.

*95% confidence interval = ± 2.87%.

†95% confidence interval = ± 2.85%.

‡95% confidence interval = 2.78%.

in each bibliographic record. The unlinked title-change record sets were solely the result of at least one type of linking number being correctly entered into either the 780 or 785 field. Therefore, for such an approach to be feasible, the linking numbers must be entered correctly in the linking fields.

It is incumbent upon serials librarians, especially those in CONSER libraries, to adopt standards for the construction of linking entries that include the incorporation of available standard linking numbers. The current CONSER standards require the inclusion of at least one record control number in linking fields when the related record appears on OCLC. However, the standards do not necessarily provide for the inclusion of the same type of record control number in all linking entries of a title-change record set. The *CONSER editing guide* specifies, "More than one control number may be given [in subfield ‡w], but only one is required" (p. 9). The LCCN must be given when the related record is authenticated. The OCLC control number is required if the related record is not authenticated. The ISSN should be given in subfield ‡x when the ISSN for the related title has been validated. "However, for U.S. titles, the ISSN should only be used when the related record has been authenticated by NSDP" (p. 11). The OCLC control number is system generated and available in all authenticated and unauthenticated records appearing in the Online Union Catalog. The mandatory inclusion of the OCLC control number in all linking entries would provide the necessary numeric links for all title-change sets with successive-entry records available in the Online Union Catalog.

The study leaves many unanswered questions that require extensive research. Approaches need to be developed to store and maintain clusters of successive-entry records in bibliographic databases. Is it feasible to maintain the clusters in a standard format that can be transferred from utilities to local systems? The need to reconstruct clusters of records each time a serial title change is searched would most certainly place additional demands upon automated systems.

It is hoped that this study will provide incentive to serials librarians, systems designers, bibliographic utilities, and CONSER to study further and develop effective methods of accessing and describing serial title changes. We must overcome the limitations of relying upon linking notes and indexing of preceding and succeeding entries to guide the user in the online catalog.

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Notes on Operations

Information Access with the Former East Germany: Book Procurement and Other Information Access Issues before and after Reunification

Thomas Kilton

The demise of the Eastern Bloc has brought about monumental changes affecting both access to information in the former East Germany and its neighboring allies, as well as the acquisition of materials by libraries through purchase and exchange from these former Communist countries. Within the short period since reunification, the transformations in the eastern German book trade toward privatization have proceeded more efficiently than have such transformations in the other former Eastern Bloc countries. Consequently, for North American libraries it has become easier to obtain materials from publishers in the new eastern states of Germany than from those in East Germany's former allies. Before the fall of Communism, problems experienced in dealing with the East German book trade were similar to those faced in dealing with book trades of the other Eastern European countries. Now, however, in dealing with the new eastern Germany, most of these problems have been overcome, although some new but minor ones have arisen. Since reunification, the improvement of acquisitions with eastern Germany and the recent freedom of access to documents in its libraries and archives are positive developments, but they create new challenges for libraries.

The demise of the Eastern Bloc and its states, which exercised repressive, centralized control of information, has brought about monumental changes affecting both access to information in libraries and archives in the former East Germany and its neighboring allies, and the acquisition of materials by libraries worldwide through purchase and exchange from these former Communist countries. At no earlier time could the fall of the Bloc have had more fascinating consequences for comparisons of library-publisher relations with Eastern Europe, and access to its information sources, before and after the fall than that of the events of October 1990 for Germany and January 1992 for the former states of the Soviet Union.

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Just within the preceding decade of the 1980s there occurred many technological advances as well as theories concerning the procurement of information within and across national boundaries of all sorts. Examples include electronic access to the online catalogs of foreign libraries, improved international interlibrary loan service, electronic document delivery, and forecasts of collaborative purchasing of library materials across national lines by the way of international conspectus projects. The current acquisitions-versus-access debate, in which the traditional procurement of materials by libraries independent of one another is pitted against collaborative procurement and increased resource sharing, has new significance. How will North American libraries secure access to new as well as retrospective publications and documents from the East now that the Cold War is over?

CURRENT EASTERN GERMAN ADVANTAGES OVER FORMER SATELLITES

The economic and social changes since German reunification have resulted in improved access to information in the former East. The ease with which purchase orders now may be placed with eastern German publishers, and the speed and efficiency with which photocopies of library and archival materials are made available to foreign libraries, are cases in point. But the changes in eastern Germany derive from many factors, not all of which have direct corollaries in the other former Eastern Bloc countries. Those countries' internal restructurings have not occurred in conjunction with reunifications with wealthy brethren. For example, unemployment and other problems are still rampant throughout the former German Democratic Republic (GDR). But financial aid and advice from the western German states is hastening the transition of the publishing industry toward privatization and free-market operational practices. The amount of aid eastern Germany receives proportionally exceeds by far the Western assistance received by countries such as Russia and Poland.

As a result, since reunification on October 3, 1990, the transformations in the eastern German book trade from state-controlled to privatized firms have proceeded with order and efficiency in comparison with such transformations in the other formerly socialist states of Europe. Consequently, for North American libraries it has become far easier to obtain materials from publishers in the new eastern Germany than from those in its former Warsaw Pact allies, where publishing operations remain chaotic.

ACQUIRING MATERIALS FROM THE GDR BEFORE ITS DEMISE

The task of securing materials from East Germany always was easier than that of securing them from other countries in Eastern Europe. Nevertheless, many of the acquisition problems formerly experienced in dealing with the GDR were similar to those encountered in dealing with the other Eastern Bloc countries with centralized state control. These included rigid, centralized book distribution centers, state censorship regarding the publishing of materials as well as their release for distribution abroad, dealing with virtually unconvertible currencies, short print runs, and in general, an opaque bureaucratic system with which to communicate.

THE FORMER GDR'S BOOK TRADE APPARATUS

In the GDR all book distribution from publisher to bookstore or library was centrally and rigidly controlled by government agencies in Leipzig. For centuries, Leipzig was the major eastern German publishing center (for foreign export by Buchexport Leipzig; for domestic distribution by the Leipziger Kommissions und Grossbuchhandel, or LKG; and for the antiquarian book market by Zentralantiquariat, Leipzig). Announcements for many current and forthcoming books (both book trade titles as well as those from learned institutions, museums, etc.) could be found in the weekly *Die Nationalbibliographie*, compiled at the Deutsche Bücherei in Leipzig (the East German equivalent of a national library), from 1949 until 1990. Monthly classified and annotated listings of forthcoming publications were also found in *Nova: Vorankündigungen*, which was mailed free of charge from Buchexport Leipzig to libraries worldwide. Fliers advertising current books were of course also distributed to foreign libraries.

PROBLEMS AND HOW WESTERN LIBRARIES COPED

For Western countries, however, the business of acquiring East German materials was fraught with chronic problems. For one thing, not all of the titles published were advertised through the aforementioned sources or were even available to the West for a variety of reasons. One reason was the restriction on the export of certain items considered politically sensitive, such as telephone books from East German cities and books on training for Olympic competitions. Many dissertations on controversial topics were not released to the West. Also, print runs of materials in general were frequently so short that supplies were not adequate for any foreign distribution whatsoever.

Another major problem that beset collection managers and acquisitions librarians was that, throughout the major part of the life of the GDR, there was no "books-in-print" source with which to identify the availablity of specific titles. The West German *Verzeichnis Lieferbarer Bücher* (the German *Books in Print*) only in recent years included materials from the East.

A further hurdle was that of the difficulty of currency conversion between the East German mark and the U.S. dollar. This rendered the placing of purchase orders directly with GDR publishers or bookstores a virtual impossibility. However, the excellent services of Western library agents such as Otto Harrassowitz, which routinely serviced purchase orders for individual titles, were available. Without these firms' services, massive blanket-order arrangements with agents, and exchange programs with libraries for both monographs and serials (similar to those formerly maintained by American libraries to receive Soviet publications), would have been resorted to in order to ensure the receipt of scholarly works. Although blanket-order programs were indeed maintained by many Western libraries with agents such as Harrassowitz for German language humanities and social science materials coming from both Germanies, these agents promptly serviced purchase orders for individual East German titles as well. Unfortunately, though, "out-of-stock" agent reports were commonly received by libraries in response to their purchase orders because of the short print runs.

Not all Western libraries, however, used Western agents to service their book orders to the East. Buchexport Leipzig, the central East German organ for foreign book distribution, did serve as a jobber of sorts for the East German book market. A small number of North American libraries reportedly dealt directly with this operation rather than with Western agents to order their Eastern materials. Two drawbacks of this firm, however, were its inability to provide blanket-order services and the lack of English language facilities on the part of its bibliographers, who routinely had difficulties communicating with the staffs of North American acquisition departments.

An aspect of the Cold War publishing scene in Europe unique to Germany was that several of the major 19th and 20th-century publishing houses, such as Reclam, Insel, and C.F. Peters, to name but a very few, maintained Western and Eastern operations with only loose ties to each other. Normally selectors had to avoid inadvertently acquiring virtually identical editions of works from Eastern and Western houses of the same name, although sometimes for reasons of editorial content, procuring both Eastern and Western editions was desirable.

Other diffences concerning library-book trade relations existed between the former GDR and other Eastern Bloc countries. For instance, it is significant that many operational features of the old, traditional German book trade involving simple business savvy remained intact in the East under Communism, whereas almost all modes of operation deriving from the old free-market structures of pre-revolutionary Russia collapsed totally following the 1917 revolution.

The poor quality of East German paper and book bindings constantly affected decisions on acquisitions during the Communist decades. This was a particularly serious problem for high-use materials. In the case of reference sources, for instance, or the collected works of major authors, decisions were frequently made not to purchase an advertised East German title if a similar one from the West could be obtained or if it was known that the Eastern item might possibly later be released for publication in a Western house, as became typical in later years. Of course, the chore of keeping track of the mere scheduling of such publications from West and East was arduous for bibliographers.

An extremely frustrating snag in acquiring materials from the old East was the often interminable delay by publishers in seeing projected works through to completion. Many stories abound concerning the extent of the featherbedding that formerly prevailed in most of the government-controlled publishing houses. These stories are at once tear-jerking and humorous. Overpacked committees that existed to make the most minute editorial decisions would agonize over inconsequential points for months, often delaying interminably the publication of announced materials, such as large reference sets. The president of a major West German publishing firm recently related the story of an art encyclopedia whose mere planning at a former GDR house was slaved over so tediously that its date of issue, according to extrapolations based on years of continued planning, would have been sometime after the middle of the twenty-first century (Saur 1991).

THE UPSIDE OF ACQUISITIONS FROM THE GDR

But not all was gloom and doom for Western libraries before the revolution of 1989. Collection management challenges from acquisitions to preservation abounded, and they were often very interesting. The terse but informative annotations in the book-selection journal *Nova* were of great assistance to selectors, even with the journal's occasional overload of Marxist-Leninist polemics and the belles-lettres of socialist realism. In perusing this journal the selector almost sensed a grasp of the entire current panorama of East German publishing output, although that was not really the case, because certain titles at press were not advertised for foreign distribution.

Another credit to the ancien régime were the scholarly journals and monographic series issued by a large number of East German universities and offered by their libraries to American partners on exchange. The series, analogous to North American and British university press series, represented a significant part of published research from the humanties, sciences, and social sciences at the Eastern universities. Although a number of them are still alive, many titles have been dropped, and the frequency of publication of many continuing titles has been reduced because of drastic reductions in editorial staffs as a result of the current downsizing mandated throughout the universities of the East.

ACQUIRING MATERIALS FROM THE NEW FEDERAL STATES OF GERMANY

RAPID PROGRESS IN BUSINESS AND TECHNOLOGY

Changes have occurred with lightning speed in the eastern German book trade since reunification. Most of the former state-run publishing houses have already been turned over by the government trust "Treuhand" to the private sector, centralized control over book distribution has vanished, publishers who in 1948 split into Eastern and Western firms have been reunited, former Eastern and Western bibliographic sources are now merged into single sources, the lengths of print runs for most materials have increased, the number of new publishers has ballooned, and more cordial relationships between Western library acquisitions agents and the eastern German publishers prevail. And last but not least, state censorship has ceased. Within libraries and archives, a virtual unrestricted freedom of information has replaced the "off-limits" status assigned to many materials deemed politically sensitive before reunification, such as those that may still be viewed in the *Giftschränke* ("poison cabinets")—formerly locked rooms.

At all of the larger research libraries, online catalogs are at least on the drawing board, if not already operational, and a further development, already fostering improved access to information, is the online network for shared cataloging. These networks, several already operative on a statewide basis, will make the existence of many formerly unpublicized or suppressed titles known universally. They will of course expedite the reduction of cataloging backlogs, and they will facilitate the international lending and photocopying of the materials whose records they contain. Typically these shared cataloging networks are composed of one western German state and an eastern state, often states sharing a common border. The Norddeutscher Verbund, for example, is such a network that consists of the western state of Schleswig-Holstein and the eastern state of Mecklenburg-Vorpommern.

FEWER ACQUISITIONS PROBLEMS THAN WITH RUSSIA

Certainly in contrast to current problems encountered by American libraries in dealing with acquisitions from Russia and the other former Soviet and Eastern Bloc states, problems in acquiring materials from the "new federal states," i.e., the former GDR, are minor. In today's dealings with Russia, for instance, the traditional apparatus used by libraries for collecting published materials—that of massive broad-profile blanket-order programs—still prevails. The servicing of purchase orders for individual titles is next to impossible because of the continued chaos of the publishing scene throughout the country. The plight of libraries in obtaining publications from Russia was recently outlined by Karen Rondestvedt (1993). The number of new Russian publishers is now about tenfold what it was five to ten years ago, although the number of new titles issued is down to roughly one-half the number issued before the Soviet Union's collapse (Leich 1993).

Similarly, in eastern Germany the number of publishers has increased, and the number of new titles released there per year is lower than the number in the years just before reunification. The chief reason why more eastern German houses are issuing fewer titles is the downsizing conducted in businesses of all types throughout the former socialist economies in order for the new or newly structured businesses to flourish. According to Knut Dorn, president of Otto Harrassowitz, eastern German houses that employed 100 workers under the old system now typically employ 12 to 15. (Dorn 1993). Also, as in the case of Russian research, less money is forthcoming from the federal government to fund projects, so fewer scholarly texts are being produced. The fact that many eastern German scholars are increasingly choosing the more seasoned western German publishers for their works also does not help the plight of the eastern German publishers. And lastly, although certain standard sets of Marx, Engels, and Lenin are still issued, the countless works in the social sciences formerly produced to extol the virtues of the socialist state, and which padded eastern book production statistics, have vanished from production.

Relations between library agents and the eastern German publishers have become so good that the agents now deal directly with the publishers, as opposed to having to go through Buchexport Leipzig, or the intermediary formerly used by agents to negotiate currency transactions, Kunst und Wissen. Western libraries are thus receiving materials ordered from the East much faster than they did before reunification, and the Western agents can serve their library customers more productively.

This situation presently contrasts strongly with the current library-vendor-publisher links to the other eastern European countries. According to the Russian and East European specialist at the Library of Congress, no agent as efficient as Les Livres Étrangers (the now defunct French firm used by the Library of Congress for materials from the former Soviet Union) has been found to service blanket orders from Russia and her neighboring states. Furthermore, the weekly selection source from Russia, *Knizhnaia Letopis*, misses 40%–50% of new titles actually being issued. In part this is caused by the general chaos inherent in the book trade's current privatization transformations amid rampant inflation, and in part caused by many of the new Russian publishers who are intent on announcing and distributing their own materials and thus do not get their titles listed in the mainstream bibliographic sources (Leich 1993). The task for selectors not to miss any such titles that have fallen through the cracks, many of which might be important titles, thus becomes extremely painstaking, if not futile.

FEATURES OF CURRENT EASTERN GERMAN PUBLISHING

A decline in the former GDR's scholarly publishing since reunification has been offset by an increase in the production of quick-selling mass-market titles in areas such as escapist literature, books on the newly acquired rights of the individual, books on the political and social changes since the fall of state socialism (many from new publishers, such as Forum Verlag in Leipzig), and travel literature, particularly about the West.

As already noted, eastern Germany is not beset with the problems of distribution and general disorder caused by a faster pace (than its neighbors) toward privatization. This more orderly publishing scene owes to the enormous assistance coming from the Bonn government and from business circles in the West. This is not just financial assistance but also professional advice and general cooperation. For instance, the reunified German Börsenverein (publishers' union) goes out of its way to make membership for publishers attractive. Thus, almost all of the former as well as new eastern German publishers publicize their products thorough the Börsenverein's book trade journal (Dorn 1993).

Furthermore, there have been takeovers of former eastern houses by western ones, countless mergers of eastern and western firms, and an amazing number of totally new eastern publishers who have sprouted since reunification. All these factors are altering the eastern book trade and of course have affected the book trade's relations with foreign libraries. Amazingly, the widespread predictions for the closing of many of the former East's eighty or so publishing houses (Hueting 1990) had not come true as of spring 1992, according to Knut Dorn of Otto Harrassowitz. Dorn (1992) noted in an article outlining eastern German publishing trends in the British *German Studies Library Group Newsletter*, "It is amazing that none of the former East German publishers have actually closed shop, in spite of the drastic changes that have taken place in the wake of the move from state-subsidized publishing to free market professional activities."

Although these publishers indeed are not receiving the state subsidies as they did under the GDR, perhaps learning business procedures from their western German colleagues has in part helped them to remain afloat. As of June 1993, according to Dorn (1993), still very few eastern publishers had closed.

MERGED BOOK TRADE ORGANIZATIONS AND BIBLIOGRAPHIC PUBLICATIONS

A significant benefit from reunification, rendering the task of book selection from western and eastern German publishers easier, has been the merging of eastern and western book trade and library organizations, as well as book selection sources. Examples are the mergers of the book trade associations (die Börsenvereine), the union of the former East and West book trade associations' journals into a single *Börsenblatt für den deutschen Buchhandel*, (similar to our *Publishers' Weekly*), the formation of a single weekly national bibliography, *Die Deutsche Nationalbibliographie*, and the joining of the former Eastern and Western bibliographies of bibliographies (the Eastern *Bibliographie der Bibliographien* with the Western *Bib-*

liographische Berichte into a new *Bibliographie der Bibliographien*).

Many eastern Germans today strongly resent the colonialist attitude commonly shown by many of their western German counterparts in helping them to mop up their mess from years of centralized mismanagement. But positive results undeniably have come from the rapid adaptations of the East to the free-trade system and to a buyer's instead of a seller's market. For instance, it is fair to say that the relations between Western library agents and Eastern vendors have greatly improved. In the last few years of the GDR, better cooperation was certainly exhibited by the Eastern book dealers, but historically throughout the GDR period, a spirit of cooperation was often lacking, communications by telephone and mail were inferior, and bugs within the centralized book distribution system often resulted in orders from Western countries not being filled.

REMAINING PROBLEMS

Are there then today no problems whatsoever for acquisitions and collection development staffs in procuring desired titles from the East? No, some indeed continue to exist, even three years after reunification. But they now surround not so much an inability to capture new releases publicized by eastern houses but rather an inability to get titles, some of major import, which, although listed in the *Deutsche Nationalbibliographie*, have not received other publicity commensurate with their importance.

Elmar Faber, a columnist for the *Börsenblatt für den deutschen Buchhandel*, laments this situation in an October 1992 commentary concerning the pure lack of attention that some eastern titles, in one case a best-seller, have been receiving from the German book trade media, including best-seller lists in prominent newsweeklies such as *Der Spiegel*. Faber cites the striking example of a recent novel, *Der Laden*, by Erwin Strittmatter, for decades one of East Germany's most respected authors. Within eight weeks of this work's release from Aufbau-Verlag in the former East Berlin, 50,000 copies were sold, although only 20% of those copies had been ordered by bookstores in western Germany. Furthermore, the novel did not once make *Der Spiegel's* best-seller list. Faber attributes the phenomenon of the book's low profile in western bookshops to a continued western prejudice against literature by authors of the former East as being substandard (a trait he finds common among "colonializing" powers). He faults German book clubs and the book trade media with not polling enough eastern bookstores concerning their sales of the novel (Faber 1992).

One can conclude only that these and other failings of the reunified German book trade industry in not adequately supporting eastern publications also likely extend to countless minor authors and publishers in the East. It is, in this author's opinion, a reason why a well-serviced blanket-order plan for German materials as a supplement to routine book selection by library selectors is still an efficient gathering device to ensure the receipt of those items that are not receiving the publicity they deserve from the book trade and can consequently fall through the cracks.

Perhaps some additional but minor problems do persist for libraries in dealing with acquisitions from eastern Germany, not to mention the universal problem of rising book costs, particularly in comparision with the costs of books in the good old GDR days. In general, however, the absence of the former problems makes for a more pleasurable and orderly task of materials selection, with feelings of assurance that knowledge about almost all titles published in the former East is procurable through bibliographic sources and that orders for advertised titles will likely be filled.

IMPROVED ACCESS TO INFORMATION SINCE REUNIFICATION

Endeavors by librarians and archivists in the new German states of the East to provide greater access to information are ongoing, from the opening of sealed archives to the provision of enhanced bibliographic control over materials. Because of relaxed attitudes concerning political and social issues, western subject heading schemes are being adopted, such as *Regeln für den Schlagwortkatalog;* shared online cataloging networks are emerging; conspectuses to foster future cooperative collection building are on the drawing boards; and countless archives from the former state-security organization (Stasi), as well as from other organizations containing formerly classified records from the years of Communism as well as National Socialism, are being unsealed.

THE NEW OPENNESS, RESEARCH, AND ACQUISITION NEEDS

In recent months a spate of scholarly as well as mass-market books in political science and history written by authors having just gained access to formerly restricted archival materials has been published by both western and eastern houses. For instance, Forum Verlag in Leipzig, a typical newly established eastern house, is publishing research based on archival findings about social problems throughout the GDR period. Much of this research has popular appeal and sells well. *Stalins DDR: Berichte politisch Verfolgter* (*Stalin's GDR: Reports of Political Victims*) is an example (Knechtel 1991). And in the West, Fischer Taschenbuch Verlag in Frankfurt has been issuing various works based on current archival research, such as the March 1993 publication of eastern documents concering Nazi persecution of homosexuals, *Homosexualität in der NS-Zeit: Dokumente einer Diskriminierung und Verfolgung*, edited by Günter Grau (1993).

Although the degree to which freedom of information exists might vary from country to country in Eastern Europe, within the states of eastern Germany it is greater than at any time since Hitler siezed power in 1933. Formerly sealed Soviet archives are also being opened to researchers at a fast pace, although to date relatively few publications on them have been issued within Russia or abroad (Leich 1993).

The intense interest of scholars in the social and political developments in Germany since reunification has already resulted in the production of valuable German research in the areas of history, sociology, and political science. It has also affected the literary scene, as former GDR authors, both loyalists as well as deserters, are reevaluated by German critics. The ongoing procurement of this scholarship for North America, whether collaboratively through shared acquisitions programs, or through individual library purchases, presents a challenge for bibliographers, acquisition librarians, and catalogers of North American libraries.

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Cataloging in the 1990s: Managing the Crisis (Mentality)

James D. LeBlanc

For decades, catalog departments in large research libraries have been struggling to keep up with an ever-growing influx of materials to be processed. This apparently losing battle, dubbed by Andrew Osborn in 1941 the "crisis in cataloging," has engendered a wide range of points of view during the past several years aimed at overcoming the impasse. In this note, the author examines some of the more pertinent access issues at stake in the discussion and calls for a rethinking of current attitudes toward the quality versus quantity debate.

> The term *crisis* seems to demand immediate, drastic action, and this sort of action is indeed often what one hears proposed. But crisis thinking typically results in ill-conceived and counterproductive initiatives (Rathje and Murphy 1992, 238).

"A crisis has been reached in cataloging history" (Osborn 1941, 410). These words chime a familiar ring—or perhaps more properly, a foreboding knell—for those of us who catalog in large research libraries. Indeed, the "crisis" that Andrew Osborn announced in 1941 (now more than fifty years ago) still seems to be operative. It both engenders and colors the current mood of distressed emergency that prevails among those of us who must grapple daily with the complexities of cataloging in the 1990s, all the while working in the ever lengthening shadow of the burgeoning backlog beast.

But Osborn's words strike a familiar note for another reason, as well, for in recent years they have graced the pages of the field's literature to a rather noteworthy extent. For example, Mary K. Bolin, in her 1991 piece, "Make a Quick Decision in (Almost) All Cases: Our Perennial Crisis in Cataloging," remarks that "Andrew Osborn's 'Crisis in Cataloging' seems as fresh and relevant today as it must have in 1941" (Bolin 1991, 357). Bolin is, in fact, merely echoing the observation of Michael Gorman who, in an article published almost ten years earlier, titled "1941: An Analysis and Appreciation of Andrew Osborn's 'The Crisis in Cataloging,'" presents the same argument (Gorman 1982). Further occurrences of Osborn's now classic phrase are not difficult to come by in the tables of contents of recent library literature (see, for example, Reid 1990). Moreover, Osborn's four cataloger archetypes—the legalistic, the perfectionistic, the bibliographic, and that model of modern-day cataloging savvy, the pragmatic—now seem to be part of virtually every commentator's terminological universe (Osborn 1941, 395–405).

There is, however, something about Andrew Osborn's clarion call to pragmatic battle that now seems a bit too familiar, perhaps even somewhat discordant. If the

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situation described by Osborn in his 1941 essay still rings true, still seems "perennial," then are we really undergoing a crisis in cataloging? Isn't there something about a condition that has persisted for some fifty years that is antithetical to the very notion of crisis? What is so momentously decisive about our current period of cataloging, a state of the art that has been evolving since before online catalogs, before *AACR2*, before network sharing, before ISBD punctuation, and even before the end of World War II? Just how critical is the "crisis in cataloging"?

Charles Cutter, in his 1904 work *Rules for a Dictionary Catalog*, outlines what he considers to be the main objectives of the cataloging enterprise (Cutter 1904, 12):

1. To enable a person to find a book of which either
   (A) the author is known
   (B) the title is known
   (C) the subject is known.
2. To show what the library has
   (D) by a given author
   (E) on a given subject
   (F) in a given kind of literature.
3. To assist in the choice of a book
   (G) as to its edition (bibliographically)
   (H) as to its character (literary or topical).

Now, are these considerations still valid? In the early 1940s, before the dizzying possibilities of keyword and Boolean searching strategies and before the advent of today's plethora of both print and online bibliographic reference products, it would have been difficult to imagine a cataloging policy that would aim to undercut seriously the objectives set forth by Cutter. Indeed, even when faced with the frightening spurt of growth in the Library of Congress' mammoth arrearage—a chief determinant of the cataloging crisis of 1941—Osborn called for pragmatism over a compulsive and often misguided punctiliousness, not for a reckless, unprincipled abandonment of the essential goals of cataloging practice. Has the role of the cataloger changed since Osborn's day? Has the fundamental purpose of the catalog changed?

Clearly, the answer to these last two questions must be "yes," or at least a qualified "no, but they are about to." The explosion of online resources and the basic ways in which these powerful tools will change the way we do our jobs are undeniable. What I would like to posit, however, is that one of the functions of the library, whether it be an old-fashioned card catalog-type facility or the high-tech "virtual library" that is on the horizon, is still to provide users with the kind of bibliographic information outlined by Cutter in 1904—at the very least. We might, in fact, regard Cutter's goals as a kind of minimum cataloging agenda. For instance, the so-called "second objective" of the catalog, set forth in the Paris Agreement of 1961, downplays the importance of the publisher's unit (e.g., the book) in favor of a focus on the "work" (e.g., the essay, poem, story, or article) as the basic bibliographic entity to be described (Wilson 1989a, 1989b).

Although the cataloging world has thus far paid little attention (at least in practice) to such descriptive paradigms as the second objective and other points of view aimed at radically enhancing the scope of bibliographic access provided by the catalog, technological advancements in both indexing/retrieval power and in publishing itself are about to force us into the post-Cutter age. How our mission will be carried out in the near and distant future is certainly an area for exciting speculation. What I would like to explore in the following pages, though, is how we came to arrive at this fast-moving threshold in a state of crisis consciousness and what the cataloger's next few steps should be before we plunge into the brave new world of hyper-informational virtuality.

The *raison d'être* of the library catalog is grounded on the notion of access. Traditionally, materials have been acquired, cataloged, and stored in such a way that users of the facility are able to gain access to them. It is essential to note, however, that achieving this access is actually a double process. First, the user has to uncover, or discover, the item that he or she seeks; second, the user literally has to get his or her hands on the book, microform, video recording, etc., in question. Two kinds of access are clearly at stake here: bibliographic access (i.e., the discovery of the item, whether through the use of the catalog or a browse of the shelves) and physical access (i.e., the opportunity to actually make use of the material).

The current role of the catalog, although preparing the way for the latter, is essentially one of providing bibliographic access to the library's holdings. It is, to a great extent, on this double-edged meaning of the term *access* that the crisis in cataloging hinges. The user's bibliographic access to an item can be severely constrained if that item is not cataloged according to the aims outlined by Cutter. At the same time, though, the user's desire to gain physical access to material can be frustrated if that material is not processed in a timely fashion and delivered to its appropriate place on the shelves. When the backlog begins to grow faster than materials can be cataloged—the situation that impelled Osborn to announce a "crisis"—both avenues of access can be affected.

It is important both to understand and periodically recall this double bind, inherent in the access question, as we glance at a few of the contributions to the "[s]eemingly endless and often paralyzing debates over the appropriate balance of quality versus quantity" (Mandel 1988, 214) in cataloging that have appeared in the library literature of the past several years. This quarrel is, to some extent, a direct result of the "crisis" and our attempts to resolve it: How much quality, if any, should be sacrificed to increase production and reduce megalithic arrearages? Should we trade a certain amount of bibliographic access for greater physical access? Do we need to? On the other hand, the very relentlessness of the debate and its lack of a satisfactory resolution might also be contributing, somewhat paradoxically, to a perpetuation of the crisis mentality.

Seymour Lubetzky, in his 1969 report, *Principles of Cataloging*, articulates the potential importance of the then recently published *Anglo-American Cataloging Rules* in the following way:

> (1) to expedite the work of cataloging—by providing for the cataloger ready directions to follow; (2) to insure uniformity and consistency in the treatment of library materials—without which the catalog would tend to become increasingly chaotic and confusing; and (3) to facilitate bibliographic cooperation among libraries—and thus serve the cause of bibliographic and cataloging economy (Lubetzky 1969, 1).

Lubetzky argues that the "uniformity and consistency" attained through the use of a rule-based cataloging code will lead not only to an enhancement of the catalog's quality (for, without this consistency, the catalog tends to become "increasingly chaotic and confusing") but also to a rise in productivity (the "work of cataloging" is "expedite[d]").

Moreover, this uniformity is essential "to facilitate bibliographic cooperation among libraries"—that is, it is by means of this type of quality control that it becomes possible to share resources and thus further contribute to "the cause of bibliographic and cataloging economy" or, in other words, increase productivity. Thus, Lubetzky, in his apologia for *AACR*, links quality with quantity in a positively proportionate way and, although one might possibly accuse him of tending toward Osborn's legalistic archetype, there is nothing in Lubetzky's extoling of the virtues of rule-based cataloging practice that would preclude the responsible use of the pragmatic cataloger's informed judgment. The important thing to note here is that, for Seymour Lubetzky, the pursuit of both quality and quantity are not mutually exclusive ventures.

Over the years, however, the value of the cataloging code has become suspect. The broadly revisionary *Anglo-American Cataloguing Rules*, 2nd edition *(AACR2)*, coupled with the Library of Congress' frequent publication of rule interpretations and refinements, have made the routine utilization of a rigorously consistent cataloging code practically impossible. Aline Soules offers the following appraisal of cataloging standards in the early 1980s (1983, 27):

> [The LCRIs] ought to prove to everyone that *AACR2*, in spite of the short time it has been in effect, is no longer recognizable. Those of us who must work with it in the field face a veritable forest of these interpretations and changes, and try to

> find a consistent path through them. The sad fact is that we'll never be able to do it.

A bit further she laments: "I'm worried about the future of cataloging and its overall quality" (Soules 1983, 27). Clearly, if those of us working "in the field" along with Soules concur with her pessimistic view of attempts to achieve the kind of quality envisioned by Lubetzky—and by Cutter before him—then perhaps the qualitative side of the quality versus quantity polemic has, in recent years, been subverted by its very impossibility. And it is indeed difficult not to agree with Soules' contention that the rules of cataloging, as interpreted by the Library of Congress, have evolved into an extensive system of Byzantine complexity.

Still another factor in the quality equation must be considered: the demands of the online format (MARC). Although we have already reflected on two moments in the work of Cutter and Lubetzky that suggest what is meant by the notion of cataloging quality, it might be helpful to look at one more summary of the goals of cataloging—this one, a more detailed and more contemporary working definition (Bolin 1991, 358):

> A high-quality cataloging record is one that identifies the item and puts it together with others of its kind. It analyzes the contents, provides as many access points as necessary, and is accurate—i.e., all headings are authorized or established correctly, there are no typographical errors or misspellings, the prescribed punctuation is correct, and all MARC tags, indicators, and subfields are correct. Such a record should be usable, without alteration, by another member of a shared network database.

Bolin synthesizes the gist of Cutter's cataloging objectives (i.e., the item is identified, analyzed, given author/title/subject access points, etc.) along with the call for consistency intoned by Lubetzky (i.e., the record should be usable by other members of a network). She also admixes into the qualitative paradigm the relatively new dimension of online formatting conventions (i.e., the use of prescribed punctuation, MARC tags and indicators, etc.—all of which are important, or at least potentially important for retrieval purposes).

Thus far, we have focused on the concept of cataloging quality in relative isolation from the question of quantity (although Lubetzky does link the two to some extent). And it should be noted that, with regard to access, we have been dealing primarily with its bibliographic component. Physical access is, of course, a direct result of the informational access provided by a quality catalog record, but physical access is, in a way, merely the next step in the process of rendering complete access to the material. The quest for quantity, as we are about to see, tends to reprioritize the terms of this procedural model.

"Some access is better than none" has become the motto of those who align themselves on the quantity side of the quality versus quantity dispute. With growing arrearages and the increased complexities involved in creating a high-quality catalog record, many feel that a certain amount of quality must be sacrificed for the greater good of getting materials out of storage and on to the shelves. This is not to say, however, that bibliographic access is completely forsaken in exchange for an increase in physical access. What the proponents of dramatically improved physical access are calling for is a reevaluation of the minimum standards for bibliographic access. Peter S. Graham, for instance, maintains that "title-page transcription of author, title, and a shelf-mark may be all that are absolutely necessary" (Graham 1990, 216). Subject headings and classified shelf-marks, according to Graham, are luxuries of service provided to the patron who, in most cases, could consult subject bibliographies and indexes for this kind of information. Even collocation of an author's works under one authoritative form of name can be dispensed with, according to Graham, because variations of a name should present no problem for the "assiduous, knowledgeable patron" (Graham 1990, 215).

The point here, of course, is to accelerate significantly the cataloging process. In addition to the already cited advantage of delivering more materials to the shelves in a shorter period, minimal level cataloging (MLC) greatly reduces the ever-rising costs of cataloging, as well. Some libraries are also running out of space for their monstrous backlogs, say the backers of minimal level cataloging, and as the refrain goes, "some access is better than none" (Horny et al. 1986). This point of view is hardly a new one. When he announced the crisis more than fifty years ago, Andrew Osborn (1941, 403–4) recommended that in a pragmatic cataloging environment

> Three distinct and approved grades of cataloging would be followed in the code and in many libraries. These would be standard, simplified, and detailed cataloging. . . . The quality of the work would be high for anything regarded as essential. Nonessentials would be given little attention or passed over.

(See also Yee 1987 for a historical account of the measures actually adopted by the Library of Congress in the 1940s to deal with the crisis.)

Whether the formulation and use of such bibliographic "grades of cataloging" are truly pragmatic in terms of both avenues of access is, of course, debatable. It is only through privileging physical access over bibliographic access and quantity over quality that appeals for such pragmatism become unquestionably convincing.

There is no shortage of caveats against the use of minimal level records as a panacea for the crisis in cataloging, and we need examine only a couple of representative samples here. Ryburn Ross and Linda West observe that items receiving minimal level treatment often get it by default. For instance, at some institutions it is material for which online catalog copy cannot be found, even after periodic researching, that is given minimal level access (Ross and West 1986, 335):

> This leads to a situation in which unique items in the national database have the least adequate cataloging, which seems contrary to a shared resources/shared cataloging policy. If one library has the only copy of an item available nationwide, it is that library's obligation to researchers present and future to give that item the fullest possible cataloging treatment, not the least.

Thus, it is often those "unique items" for which full bibliographic access will be difficult to come by (in subject bibliographies and indexes, as well, we might expect) that end up with the most superficial cataloging treatment. Osborn's "grades of cataloging" notwithstanding, the productivity dividend that we reap from network sharing is often lessened by a member's failure to contribute a full level record to the national kitty. As Ross and West put it (1986, 335): "If every research library in the nation did its fair share each year in adding full catalog records to the national database, libraries might not be faced with the prospect of having to consider MLC."

But it is perhaps from the point of view of library reference work that what is at stake in the MLC controversy is put most dramatically into relief. In his compelling "Cataloging Quality, LC Priorities, and Models of the Library's Future," Thomas Mann, a reference librarian at the Library of Congress, gives six concrete examples of reference questions that he feels can be answered only if the materials that provide him with a response to the patron's query have been given full bibliographic access on the catalog record. He remarks (1991, 9):

> What I am concerned about . . . is the naïveté about reference that apparently lurks behind the assumption that MLC books, with "some" record, are "still" accessible. In the large majority of cases they simply are not.

Later he adds (1991, 10):

> The assumption behind MLC seems to be that people will actively search for its records or take extra steps to find them. But the reality of reference is that they will do no such thing. As a general rule, they will find—and settle for—whatever we make it easy for them to find. (The principle of least effort is a reality—and, yes, even with "experienced" scholars.)

What Mann is claiming, then, is that as far as full bibliographic access is concerned, we are risking the condemnation of a generation of unique materials to a kind of bibliographic black hole, in which physical access—the end component of the complete access process—becomes a mere theoretical possibility: The item will be on a shelf and bear a shelf-mark, but its existence will be in many ways concealed by the lack of subject and added entry tracings on the catalog record. While it is true that the "known item" (i.e., the item of which the principal author and/or title is known—the contemporary and much-diluted *sine qua non* that weakly corresponds to Cutter's first objective of the catalog) will be accessible, many of those items that are not "known" will languish in dusty obscurity.

What is to be done? Clearly, Osborn and his successors cannot be offhandedly dismissed as overreacting purveyors of cold, short-sighted, pseudorealism who simply have no appreciation for the importance of the high-quality catalog record. The ever expanding backlogs and soaring costs of technical processing in the nation's major research libraries are incontrovertible evidence of a harsh reality that cannot be ignored.

On the other hand, it would seem unwise to discount the warnings of those such as Ross, West, and Mann by attributing their opposition to such high-volume processing methods as minimal level cataloging to a kind of old-fashioned, bibliotechnical idealism. If the objectives of the catalog, as set forth by Cutter in 1904, are still operative with regard to the bibliographic aspect of the access question (and, in spite of arguments to the contrary by such commentators as Peter Graham, most of the librarians writing about the issue over the past few years would seem to agree with this proposition), then how might we go about addressing the fundamental problem of increasing physical access without jeopardizing our commitment to the attainment of Cutter's objectives?

What is needed, it seems, is balance, a procedural middle ground, an admission by the cataloging community (and by its administrators) that both sides of the quality versus quantity issue are of significant importance. Sacrificing one at the expense of the other undercuts overall access to our collections. We need to breed an attitude that synthesizes the two poles of the dialectic and raises it to a higher plane. Moreover, this dialectical reevaluation of what constitutes even the most fundamental principles of the cataloging enterprise needs to be embraced by both individuals and institutions alike, given the pervasive network implications of the individual cataloger's work. As Mary Bolin suggests (1991, 360):

> Administrators must provide training, tools, and as pleasant a working environment as possible; they must create reasonably designed jobs and maintain realistic expectations. But beyond that, the individual must take the initiative . . . catalogers must be willing to admit that quantity is as important as quality in cataloging.

There has been no dearth of ideas and proposals for specific initiatives and strategies that might contribute to a more balanced approach to the quality/quantity situation. In fact, the field's literature includes discussions of many techniques that have already gone beyond the theoretical stage and have been implemented as part of routine cataloging practice and policy at several institutions. What follows are a few general guidelines, loosely derived from a survey of some of these pragmatic, one-step-at-a-time approaches to dealing with the "crisis."

STRIVE FOR WIDER, LESS FASTIDIOUS USE OF MEMBER-CONTRIBUTED CATALOG COPY

Now that systems technology has furnished us with the capability to upload and download full-level MARC records from local systems to national utilities, and vice versa, we are able to take advantage of other libraries' original cataloging with little or no rekeying of data. However, it has been difficult, it seems, to wean ourselves of the need to tidy up and enhance these records into elegant works of MARC data art (a highly skilled, but to some extent subjective practice). As Carol Mandel puts it: "In many libraries [copy cataloging] still mimics original cataloging in its individual scrutiny of each record" (Mandel 1992, 2). This is not to say, though, that member copy should be blindly accepted without some kind of revision (although this appears to be what Mandel is driving at).

"Conventional wisdom," writes Sheila Intner, "does not support the notion of accepting network records as is, willy-nilly, without editing." She goes on to temper this remark by observing: "Current trends in information service won't permit catalogers to continue keeping faith with the ideal of producing perfect catalogs made up of perfect catalog records" (Intner 1990, 13). Nonetheless, if Intner's gloss of "conventional wisdom" is on the mark, then it would seem that some kind of editing of member records is, in many cases, desirable.

One approach to dealing with the quality (or lack thereof) of member-contributed catalog copy might be to try to identify those institutions doing consistently superior work and to accept their catalog records with little or no revision. McCue, Weiss, and Wilson have shown that the amount of editing required on a good member record is no more than that called for on a Library of Congress record, which presumably can be accepted almost as is for local use (McCue, Weiss, and Wilson 1991).

Another tenet of pragmatic copy cataloging that we might do well to keep in mind is the bottom line: access. Errors in those parts of the record that are purely descriptive, although disturbing to a good cataloger's temperament and perhaps unsightly in the catalog, are far less crucial for retrieval purposes than errors in access points (Graham 1990, 215). Thus, identification of those institutions doing high-quality work and, for the rest, a focus on the question of access would constitute a reasonable prescription for a healthy, balanced attitude in copy cataloging practice and policy. No tweaking, no tinkering.

STRIVE FOR BETTER ORIGINAL CATALOGING

Original cataloging must improve. No, there is no need to bash the Library of Congress, whose catalog records over the years have represented what most see as the paragon of good cataloging practice. It is, in fact, the uniformly superior quality of these records that has led libraries across the country to download and utilize LC copy virtually unrevised for their own local catalogs. If we are to make better use of member-contributed copy, however, if we are to download and use these records quickly and efficiently without significant immolation of bibliographic access, then we must do more to ensure that the overall quality of member records is reliable.

Ross and West stress the importance of the original record-to-be-shared in their rebuttal of the case for MLC: "Undergirding many of the cooperative library programs of the past several decades has been the aim of having a title cataloged once, *fully and well*, and then sharing that record with any institutions acquiring the title" (Ross and West 1986, 335, emphasis added). And Richard Reeb, speaking as a contributor to OCLC (but adopting a point of view that is currently applicable to other networks, as well), maintains: "Since in the OCLC system, in particular, member libraries add new records without their being reviewed at a higher level, the responsibility for the quality of a record rests with the library inputting it" (Reeb 1984, 21). In other words, if we are to relax effectively our vigilance over the quality of member copy that is being adapted for use in our individual local catalogs, without compromising bibliographic access to our holdings, then we must collectively take the responsibility for reinforcing and refining our standards for the original record.

And it is, indeed, a question of standards: the standards that *AACR2* provides and the standards that LC outlines in both their documentation (e.g., the *Library of Congress Rule Interpretations*, their *Subject Cataloging Manual*, etc.) and in their practice. It is these standards that should allow us to attain the "uniformity and consistency" that will "expedite the work of cataloging," as Lubetzky claimed back in 1969. In a more recent essay, we read (Bolin 1991, 359):

> If we are to achieve the goal of accepting cataloging from the networks just as it is without undue scrutiny or editing, then of course we need to feel that we are all following the same standards and that a library assistant can easily decide whether the item to be cataloged matches the record in the database.

As Bolin goes on to explain, this is easier said than done, given the "flood of manuals, bulletins, directives, messages, and policies" with which the cataloger must contend in an effort to create the "standard" record, but it is not impossible.

Judith Hudson and V. Louise Saylor argue eloquently for the need for good training and continuing education of original catalogers. They also present a strong case for periodic revision of catalogers' work (Hudson 1987; Saylor 1990). Ultimately, though, the responsibility for contributing high-quality records to national databases rests on the shoulders of the individual cataloger, and it is incumbent upon cataloging units and technical services departments to encourage such an attitude. In Saylor's words: "To establish and sustain a commitment to quality cataloging, the value of, and the responsibility for, such copy must be accepted at the local level" (Saylor 1990, 104). Some of the specifics that can be employed include next-day proofreading of original records, working groups and other forums in which catalogers can discuss the details and tricks of their trade, and an overall fostering of the notion that original cataloging is not an easy task and that this skill must be honed and continuously developed. These specifics can be part of broader departmental policies aimed at improving the quality of the original catalog records that are contributed to national databases.

It should also be incumbent on technical services administrators to make sure that the best available people are doing the original cataloging. An M.L.S. does not guarantee cataloging competence. As Patricia Eskoz writes: "Cataloging is not a mystic art and most of the skills required can be learned on the job. It does take dedication, experience, and consistency, and there must be careful training and supervision" (Eskoz 1990, 391). While Eskoz still believes that a library school education significantly increases one's ability to perform high-level cataloging work, she notes a growing trend toward using non-M.L.S. catalogers to do original cataloging (Eskoz 1990, 388; also Hafter 1986).

We would do well to keep our minds open on this issue. In many large academic libraries, one can find veteran copy catalogers with vast subject and/or language backgrounds (and even advanced degrees) who demonstrate a real aptitude for the quirky rigors of cataloging but who, because they do not brandish an M.L.S., are excluded from doing original work. Instead, a recent library school graduate, who perhaps has a less extensive subject or language background and is unproven as a cataloger, is often asked to contribute original records-to-be-shared to a national database. This is not to say that a certain number of well-schooled librarians (who might also be crack catalogers) are not essential to the smooth and intelligent functioning of a large technical services department, but it is debatable whether the hackneyed notion of seeing and foreseeing the "big picture" with regard to cataloging really outweighs the more fundamental factors of language and subject background, detailed attention to MARC, and cataloging savvy.

Furthermore, professional nonlibrarian catalogers have the opportunity to devote full-time to their trade, without continually balancing cataloging time with concerns about tenure and other academic advancement, meetings, task forces, etc. Ways should be found to tap into this valuable resource. As Sheila Intner notes: "Many of us would add another cause [in addition to the forces and conditions usually cited] of the current crisis in cataloging—the absence of competent catalogers" (Intner 1987, 10).

STRIVE TO TRANSFORM THE "BACKLOG" INTO AN "UNCATALOGED, IN-PROCESS COLLECTION"

Carol Mandel asserts: "We have been given the mandate—in the form of reduced budgets, growing backlogs, and an increasingly impatient clientele—to rethink our practices" (Mandel 1988, 214). This is indeed true, but we should also bear in mind the words of Thomas Mann (1991, 10):

> Perhaps most of all we need to reduce the priority of the book backlog problem. Perhaps the pressure needs to be removed from the managers' backs to make so many

> cuts in the quality of the book cataloging. Perhaps attention could be focused instead on the nonbook formats, where collection-level treatment offers a hope of generating large statistics relatively quickly.

Mann's privileging of books over other formats aside (i.e., one could argue that nonbook formats should not be bibliographically short-changed merely because of the ease with which they might be given collection-level treatment), the idea of reducing the priority of the backlog problem bears investigation. If *minimal* level cataloging can be marshaled forth as a response to the mandate to which Mandel refers, why couldn't the equivalent of minimal level treatment be given to the backlog? That is, shouldn't we enhance the quality of acquisitions-type records a bit in order to ensure authority control over the heading for principal author and accuracy of the title proper transcription (all that Graham considers to be essential bibliographic access for the "assiduous, knowledgeable patron") so that materials could be given minimal level bibliographic access while remaining in-process, thus preserving the full access integrity of the cataloged collection as a whole?

In this way, items with less than desirable access through the online catalog would remain in the cataloging pipeline, working their way toward eventual full-level status and a classified home on the shelves. They wouldn't just be relegated to places of obscure bibliographic and physical availability (albeit in the stacks) until that time when the catalog department has the opportunity to go back and provide them with more complete and useful access (i.e., never).

Such an in-process collection could circulate, of course, even though the materials might not be immediately available as far as the patrons' direct physical access to them is concerned. (This situation is not unheard of in most large libraries, even with regard to fully cataloged but, to some extent, closed-access collections—e.g., rare books, seldom requested items stored in a remote facility, etc.) The waiting period for the user would be extremely brief, however, because the item would simply need to be retrieved from the in-process area, the holdings of which could be stored by accession number, order number, date received, etc., and be already bar coded and security stripped. (Some research libraries are already doing this; more should.) Dividing the collection into cataloged and uncataloged areas could be an important first step toward reaching a sensible middle ground between the high-volume physical access priorities of the MLC camp and the traditional, well-founded warnings of the proponents of high-quality bibliographic access.

STRIVE TO MAKE USE OF EVER-EXPANDING, EVER MORE SOPHISTICATED ACCESS TECHNOLOGY

Sheila Intner speculates: "If cataloging were removed from the hands of well-meaning but unschooled library staff and put into the realm of automatic computerized production, it would probably improve immediately" (Intner 1990, 14). Thomas Mann, however, cautions us about the limits of a completely high-tech replacement for our current, seemingly troglodytic approach to the processing of library materials and the "mistaken assumption that the 'computer workstation of the future' can substitute raw computer retrieval power (applied to unstructured data) in place of the intellectual structure that reference librarians and researchers now rely on" (Mann 1991, 4). Clearly, though, it behooves us to step up the pace of information science research into the myriad possibilities presented to us by improved computer technology. If the computer can save us, even at the expense of our venerated cataloging traditions, so be it.

Systems technology has already irrevocably changed the nature of the catalog. In a recent essay, Carol Mandel writes (1992, 2):

> The catalog is the finding tool for, or window to, the collection, with the collection defined as those documents to which the searcher has physical and/or electronic access. The borders of the collection are continually being expanded outward as new means of document access and docu-

> ment delivery are provided. The catalog can contain a variety of levels of indexing to those documents. The finding tool can be merged with the material itself as full electronic texts are available; i.e., the material itself can become the finding tool.

We must be careful not to jump the gun, however, in our understandable excitement about the online catalog of the future, which is already peering from just beyond the hypertextual horizon. As Mandel herself goes on to point out, with regard to the virtual library (Mandel 1992, 2):

> The monographic literature will not lend itself quickly to this form of library, and the existing vast store of paper-based collections will not soon be converted. The library as "place" and the "virtual library" will co-exist for some time to come.

And finally (Mandel 1992, 4):

> Perhaps the greatest challenge is to break existing conceptual barriers so that librarians closest to the process can begin to move incrementally but creatively towards new techniques and approaches.

Incrementally, indeed. Patience. Deliberate speed. *Webster's Third New International Dictionary of the English Language* lists, among others, the following definitions of the term *crisis* (Webster's 1966):

> 2a: the point of time when it is decided whether an affair or course of action shall proceed, be modified, or terminate: decisive moment: turning point . . . 3a: an unstable state of affairs in which a decisive change is impending . . . b: a psychological or social condition characterized by unusual instability caused by excessive stress and either endangering or felt to endanger the continuity of the individual or his group.

The decisive moment, the turning point announced by Osborn in 1941 has never really materialized, or else it has been held in indefinite suspension for some fifty years without yielding the cataclysmic consequences portended by his dire warnings. Cataloging methods have evolved and, since the introduction of the computer into the bibliotechnical environment, have evolved more and more rapidly. The current cataloging situation should not be regarded or addressed as a crisis for which drastic measures must be implemented. The backlog leviathan is not going to kill us; it can be controlled. More and more powerful access tools, more and more sophisticated and complete databases, faster and faster means to input, scan, or otherwise feed information into whatever it is the library catalog is to become—these evolutionary steps will no doubt bring us closer and closer to resolving the current issues of the quality versus quantity debate, while at the same time moving the dialectic of access to a higher, more technologically advanced level.

But it is important to proceed one step at a time and to avoid condemning an interim generation of books, serials, microforms, sound recordings, videotapes, computer disks, or materials in any format whatsoever, to a bibliographic limbo, the access to which might be permanently handicapped. If there is a crisis in cataloging, it is more likely one that corresponds to the last connotation of the term, cited above: "a psychological or social condition . . . caused by excessive stress and either endangering or felt to endanger the continuity of the individual or his group." Cataloging, as we know it, might be a dying art, but bibliographic access is likely to remain one of the cornerstones of the library's mission, and those of us who are in the business of providing this access will have a vocation for a long time to come.

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Cooperative Preservation of State-Level Publications: Preserving the Literature of New York State Agriculture and Rural Life

Dorothy Wright, Samuel Demas, and Walter Cybulski

A national plan for preserving the literature of agriculture is currently under development. Two projects at Cornell University have been proposed as components of the emerging plan: one aimed at preserving core titles of national interest, the other focusing on materials concerned with agricultural and rural life in New York State. This article is a description of the latter: a pilot cooperative project for reformatting state-level literature within the framework of a national preservation plan. This project, conducted in cooperation with the New York State Library, is based on a systematic bibliographic analysis and evaluation of the literature of New York State agriculture and rural life. It involves a partnership of librarians and scholars seeking to identify and preserve the most significant agricultural literature of a state. This approach to setting preservation priorities for New York's agricultural literature was developed as a model for other land-grant and state libraries to use in projects to preserve their own state's agricultural literature.

Given the scale of the preservation challenge—currently about 75 million brittle volumes in Association of Research Libraries member libraries (U.S. Congress 1988)—it is unlikely that society will allocate sufficient funds to save all of the endangered publications in a given academic discipline or library. Difficult choices must be made, and preservation must proceed within a rational, nationally coordinated, cooperative framework.

Currently, research libraries are involved in a wide variety of loosely coordinated preservation efforts across a variety of academic disciplines. Priorities and methodologies tend to be driven more by the availability of national-level funding than by a coherent approach to the needs and priorities of individual disciplines or

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libraries. The issues and inherent difficulties surrounding preservation selection decisions and currently used approaches have been widely discussed in the literature (for example: Atkinson 1986; Bagnell and Harris 1987; Child 1982; and Tomer 1979). Debates continue as libraries search for alternatives more focused than the "clean sweep" approach (in which all brittle materials in a very strong collection or subject area are preserved regardless of the condition, use, or value of the individual items; this approach is based on the assumption that the collection represents the universe of literature in a discipline) yet more suited to cooperative efforts than the "use and condition" approach (in which selection is based on the extent of use and physical condition of a title in a particular collection). Each has its advantages, but neither effectively looks beyond the preservation of individual library collections to the systematic preservation of the literature of disciplines.

National preservation planning, discipline by discipline, is emerging as a rational model for establishing priorities. Under this approach, individual and cooperative projects are designed within the framework of a national plan for preserving the literature of a discipline. Such a plan, based on a systematic bibliographic analysis and evaluation of the literature of a discipline, involves a partnership of librarians and scholars. Careful analysis of the discipline's literature and of the needs of scholars provides the basis for dividing the challenge into a number of logical, achievable projects. Projects carried out under a national preservation plan would encompass a full range of preservation treatments, including reformatting brittle materials (to microform, preservation photocopy, or digital formats) and conservation of materials in their original format (through minor repair, protective enclosures, deacidification, or restoration of rare materials).

Each institution's preservation efforts, while building on both collection strengths and constituent needs, are designed to contribute clearly to the larger, nationally coordinated plan. Some projects aim at preserving a corpus of brittle materials of broad national interest, while others focus on materials primarily of interest to a specific state or region.

A national plan for preserving the literature of agriculture is currently under development. Two projects at Cornell University have been proposed as components of the emerging plan: one aimed at preserving core titles of national interest, the other focusing on materials concerned with agricultural and rural life in New York State. This article is a description of the latter: a pilot cooperative project aimed at reformatting state-level literature within the framework of a larger preservation plan.

THE CONTEXT: PRESERVATION OF AGRICULTURAL SCIENCE LITERATURE

Within the discipline of agriculture, considerable reformatting work has taken place over the years, mostly as a by-product of preservation activity in other disciplines. The notable exception (i.e., a large-scale project focused clearly on important agricultural materials) was the National Agricultural Library (NAL)/land-grant publications project. This cooperative microfilming effort, funded by NAL and carried out with the cooperation of land-grant institutions, resulted in the reformatting of the experiment station publications of forty-six states. Some state historical societies (Wisconsin and Ohio are prime examples), commercial microfilmers, and agribusiness corporations have filmed agricultural materials. Few land-grant institution libraries today are engaged in preservation projects focusing exclusively on agricultural science materials (Demas 1991).

As a leading land-grant university, Cornell University has worked with the United States Agricultural Information Network to initiate a nationally coordinated plan to preserve and provide access to the historical literature of the agricultural sciences. The aim of this long-range program is to help ensure the widest, most cost-effective dissemination of agricultural information nationwide. This national preservation plan provides a disciplinary framework within which to divide the challenge among individual or cooperative projects. These projects may be structured around genre, period, region, subject, or some combination of these (Demas 1991) and may include reformatting to microform, preservation photocopy, or digital formats or conserving material in its original format.

One major component of this national plan is Cornell's Core Historical Agricultural Literature Project, underway at A. R. Mann Library under the direction of Wallace C. Olsen (McDonald 1991; Wright and McDonald 1991). The aim of this project is to identify the most influential and historically significant U.S. titles in the agricultural sciences in order to set preservation priorities for this literature. The core literature methodology shifts the selection for preservation from review of titles held by a particular library to that of systematic evaluation of the historical literature of a discipline (Olsen 1991; Olsen and Kennedy-Olsen 1991). This analysis takes place prior to making treatment decisions for titles. Seven disciplines within agriculture (agricultural economics and rural sociology; animal science; agricultural engineering; crop protection and improvement; soil science; forestry; and home economics and food and nutrition) are bibliographically analyzed using a combination of citation analysis and critical review by senior scholars and scientists. Based on the scholarly rankings and bibliographic factors, each title is assigned an overall score and classified as first, second, or third priority for preservation treatment. The resulting lists, representing a qualitatively selected core of the historical literature of each discipline, will serve as the basis for cooperatively preserving historic agricultural titles of national importance.

Publications about agriculture or rural life in a specific state are excluded from the analyses conducted in the Core Historical Agricultural Literature Project. It is proposed that each state preserve its own relevant state-level publications. To serve as a model for the states, we have adapted the core literature methodology for the identification and preservation of the historical core literature of New York State's agricultural and rural life. The literature compilation-and-evaluation process used in this project will be described. It is hoped that these methods can be utilized by other land-grant libraries or institutions interested in preserving the literature of their state's agricultural and rural history. Each state project would further contribute to the national, coordinated preservation plan.

NEW YORK STATE AGRICULTURE AND RURAL LIFE PRESERVATION PROJECT

A core literature strategy for preservation selection is being successfully applied in a project to identify and preserve the core historical literature of New York State's agriculture and rural life. This project is funded by a multiyear New York State Coordinated Preservation Project Grant. A.R. Mann Library, at Cornell University, and the New York State Library are partners in the project. Sam Demas is Project Director, Dorothy Wright is Project Coordinator at A.R. Mann Library, and Jim Lane is Project Coordinator at the New York State Library. Walter Cybulski (formerly with the project) contributed to the bibliography.

Our goal in this project is to identify and evaluate systematically the core historical literature of New York State agriculture and rural life in order to set preservation priorities for the literature as a whole, not just for the titles held in each of our library collections. To accomplish this goal, we had first to identify the universe of material. Utilizing a wide range of printed publications, bibliographies, and electronic sources, a comprehensive bibliography of pre-1945 published works was compiled—the first such bibliography in this area of research consisting exclusively of New York State material.

Next, a team of scholars knowledgeable about agricultural and New York State historical literature evaluated and rated the most significant materials from the bibliography. Using a rating scheme devised by the Core Historical Agricultural Literature Project, reviewers assigned each title to a first-priority core list or to a second-, third-, or fourth-priority list. While the review process in each project is similar, a major methodological difference between the

New York State Project and the Core Historical Agricultural Literature Project involves the way in which the reviewed bibliographies are compiled. The Core Historical Agricultural Literature Project uses citation analysis to arrive at a list of titles for review, whereas the New York State Project sought to compile an exhaustive bibliography of the literature for review.

Finally, both Cornell and the New York State Library initiated reformatting of material from the core or first-priority list and second-priority lists. Titles on the second and third lists will be microfilmed as far as funding allows. A total of nearly 2,289 volumes will be reformatted to preservation quality microform over the four-year grant period, 1989–1993. Furthermore, we now have a reliable index of the work that remains to be done to complete the task of preserving the entire corpus of agricultural literature of New York State. One important benefit of this work is that both participating institutions will have a complete set of positive microfilm service copies of all materials reformatted during the course of the project. This arrangement permits each library not only to preserve items in its collection but to strengthen its collection by adding microform copies of materials not previously held. Researchers will have access to the entire body of preserved material in both Ithaca and Albany.

DEFINING THE SCOPE OF THE LITERATURE

The first step in the literature identification process was to define the scope of the literature to be analyzed. We established specific subject parameters and criteria for inclusion and exclusion to ensure that the scope of the bibliography would be clearly understood by those compiling and evaluating it.

Some broad areas of inclusion were publications with relevant subject matter published between 1820 and 1945, publications by or about Cornell and its role as a land-grant university, publications by or about the New York State College of Forestry and Environmental Science, relevant Cornell and other university master's or doctoral theses, and New York State documents.

Some broad areas of exclusion were manuscript or archival materials, titles of individual numbers published in series or reprints of individual articles, almanacs, daily newspapers, maps and gazetteers, publications of entities below the county level, New York State legislative documents, U.S. Census or legal materials, county histories, and Colonial-era publications. In addition, no attempt was made to be comprehensive in works of fiction about rural New York, in the genre of materials classified as "description and travel," or in the pamphlet literature (i.e., publications of fewer than 50 pages).

Broad subject parameters included technical agriculture, rural economy, and rural society specific to New York. The criteria for inclusion or exclusion, subject parameters, and specific subject headings searched were modified over time as the bibliography progressed and we learned more about the literature. Initial efforts to be extremely comprehensive eventually led to a more focused approach in order to define a meaningful and manageable scope of literature, particularly for post-1900 publications.

Many subject areas touch on agriculture and rural life. Post-1900 literature in particular required frequent decisions regarding relevance to the bibliography. Examples of ambiguous areas in the literature include the interrelationships (not always obvious) that exist between agriculture and areas such as transportation, business, industry, trade, law, government, food marketing and supply, land use, and labor. Titles in these areas that did not have distinct relevance to the study of New York State agriculture were excluded from the bibliography.

METHODS AND TOOLS FOR COMPILING THE BIBLIOGRAPHY

Once the scope of the bibliography was determined, the compilation process involved an extensive review of both print and electronic sources. About half of the citations came from online sources and the other half from print sources. To facilitate database review, subject headings were selected from the *Library of Congress Subject Headings* yielding a list of about forty major subject areas (e.g., agriculture, rural, country, farm, etc.) for searching. Including variations and subheadings, almost 800 unique subject terms were searched. Hundreds of corporate names were also searched, including Cornell University, the New York State Agricultural Experiment Station, and New York state government and agricultural association name headings.

Selected subject headings and date parameters were searched in the Cornell and the New York State Library online catalogs and the databases of the Research Libraries Information Network and the OCLC Online Computer Library Center, Inc. Because several subject headings could be assigned to each record, there was inevitable duplication in the records retrieved from each online source. In addition, there was overlap between the different online systems we used. We found, however, that there were unique citations in each source, which necessitated searching all online sources to ensure comprehensiveness. Electronic databases and the *National Union Catalog* proved useful as verification tools for titles incompletely cited in print bibliographies and lists.

Relevant online records were downloaded to disk and transferred to ProCite (version 1.4), a sophisticated database management program specifically designed to handle bibliographic references. One important feature of ProCite is its compatibility with Biblio-Links, a reformatting program that transfers records downloaded from online database systems directly into a ProCite database. Other features of ProCite software include variable field and record lengths, merging, sorting, searching, indexing and duplicate record detection capabilities, and the ability to customize a work form for data entry. Bibliographies of records can be generated in a variety of standard or individually customized styles.

ProCite proved to be a satisfactory package for our purposes despite some limitations of the software. For example, Biblio-Links would not transfer downloaded records to a user-defined work form. Although ProCite has numerous pre-defined work forms for data entry, none was suitable for the purposes of our project. We wanted the database structure to contain not only bibliographic information but additional information about the title such as its location, condition, rating by scholars, and preservation priority. In order to transfer downloaded records into our ProCite user-defined work form, Biblio-Links had to be modified, and a cumbersome multistep series of importing, exporting and editing procedures developed. Once entered, the transferred records often had to be edited to correct problems that occurred during transfer, including deleting extraneous information and adding missing information from the machine-readable cataloging record. The duplicate detection feature was useful, but the match between duplicate records had to be exact, letter for letter and space for space, so duplicate titles frequently were not detected. The new version of ProCite (2.0) has features (such as a global work form change capability) that should remedy some of the problems mentioned above.

Lists generated from online sources were supplemented with citations from printed sources, including scholarly bibliographies produced by the Library of Congress, dictionary catalogs, repository shelflists, source bibliographies appended to chapters of books, and lists of titles available from prominent New York-based agricultural publishers such as Saxton, Moore, and Orange Judd. More than 125 publications and bibliographies were examined. An additional important resource turned out to be the State Library's collection itself, which had benefited from the donation (circa 1900) of the New York State Agricultural Society's original library. Compilation work was also facilitated by direct access to the State Library's New York State Documents collection.

Major sources consulted included the dictionary catalogs of the New York Public Library, the National Agricultural Library, and the Giannini Foundation of Agricultural Economics Library. We analyzed shelflists in the Cornell University Libraries, the New York State Library, the New York State Museum, the Albany Institute of History and Art, the New York State Historical Association Library, and the Buffalo Historical Society.

SCHOLARLY REVIEW PROCESS

The finished bibliography contained 2,890 citations. To make the list more manageable for review, we divided the bibliography into numerous categories. More than half the citations were excluded from review, including pamphlets (fewer than 50 pages) and theses. We felt that these two categories of materials could best be handled as separate preservation projects. In addition to these materials, the monograph and serial list of titles already filmed (222 citations) were sent to reviewers for informational purposes only.

Prior to distributing the bibliography for review, Mann Library hosted a meeting to discuss a range of issues concerning the bibliography, including its purpose, compilation methods, subject scope, completeness, plans to supplement, rating scheme, the scholarly review process, and uses and publication of the rated lists. Preservation and collection development librarians from the two participating institutions and reviewers were invited to attend.

As a result of this meeting, several changes were made in the organization and arrangement of the bibliography in order to facilitate the scholarly review process. Because historians tend to specialize in particular subject areas and time periods, the bibliography was subdivided into subject categories and arranged in reverse chronological order. Monographic citations were placed into one of eight subject categories (agricultural economics; agricultural engineering; animal science; soils, crops, and atmospheric science; forestry and natural resources; food and nutrition; rural life; and miscellaneous). This arrangement made it easier for the reviewers to see each title within the context of the subject matter and the period of the publication. A total of 566 monograph titles were reviewed.

Serials were arranged into one of five categories depending upon the type of publication (serials about New York State agriculture, serials published by the state of New York, Cornell and other state agricultural related institution publications, county publications, and serials published in New York but not necessarily focusing on New York). A total of 782 serial titles were reviewed. Nearly 40% of the serials in the bibliography were published in New York but did not necessarily focus specifically on New York's agricultural concerns. Because these journals had regional and national influence, we felt that they were important to include in our list. (See appendix A for monograph and serial subject categories, categories excluded from review, and the number of citations in each.)

A total of 1,348 monograph and serial citations were sent to four scholars selected for their knowledge of agricultural or New York State history. Each brought a unique background and point of view to the project. Reviewers included Gould Colman (Archivist and Historian at Cornell University), a specialist in New York agricultural history; Morton Rothstein (of the Agricultural History Center, University of California–Davis, and the editor of *Agricultural History*), a specialist in agricultural history; Wendell Tripp (of the New York State Historical Association, and the editor of *New York History*), a specialist in New York history; and Donald Marti (Professor at Indiana University in South Bend), an agricultural historian and bibliographer of agricultural literature. Each received an honorarium for their services as bibliographic consultants.

The reviewers were sent a packet of information that included the lists for review, instructions for rating the lists, information on the scope of the bibliography and on the compilation process, and a bibliography of sources consulted in compiling the lists. The following rating scheme was provided for use in determining the relative importance of each title for historical research compared with other titles within the same list:

1. Very important historical title; first priority for preservation in this grant project.

2. Definitely worth preserving; funds permitting, should be preserved as part of this project.
3. Worth preserving at some time if possible, but of lower priority.
4. Not worth preserving.

Reviewers were asked to give their best judgment on unfamiliar titles based on the subject, author, title, publisher, period, genre, etc.

In addition to the four scholarly reviewers, Sam Demas (Project Director) also evaluated the lists from the point of view of a bibliographer in the major New York State agricultural research library. While the evaluation criteria used by Demas were essentially the same as those used by the scholars, we felt a practicing librarian could contribute a broad perspective on how the materials are used by students and scholars in many disciplines, and a sense of the relative scarcity of the publications.

RESULTS OF THE REVIEW PROCESS

The reviewers returned the lists in about six weeks. Each reviewer had rated every title on the list. We compiled the results of the evaluation by averaging the rating assigned by the reviewers to each title (see table 1).

After analyzing the results, ranges were assigned to sort the ratings into logical and manageable priority groups. Titles that fell into the 1.0–1.5 range became the #1, or core, titles; titles that fell into the 1.6–2.0 range were rated as second priority.

There was remarkable similarity in the way the historians viewed the literature. A random sampling of the ratings showed that the four reviewers rated each title either the same or one rating apart more than 90% of the time. In only 1% of the cases did they completely differ (meaning that one reviewer rated a title a #1 and another a #4).

We have begun the work of preserving the #1 and #2 rated serials and monographs. Not surprisingly, we are finding that many of these titles have already been preserved by commercial vendors such as UMI and Research Publications in regional and local history microform sets. We expect to preserve all of the first- and second-priority monograph and serial titles that we can locate during the course of the project. Funding permitting, we will then select titles in the third-priority range. The bibliography will continue to serve as a guide in selecting the most significant titles for preservation treatment should additional funding become available in the future.

While the participating libraries' collections were a primary source of reformatted materials, an important function of this project is to look beyond the holdings of individual collections to reformatting core titles regardless of where they are housed. One of the problems we have encountered is locating copies of titles that are not held by either of the participating institutions. This includes missing serial volumes or issues and, more importantly, core titles that neither library owns. Because we are interested in reformatting the literature of a discipline and not the collections in our individual libraries, we have gone to extensive lengths to borrow these titles for filming. Land-grant and research libraries, state agricultural societies, and county extension offices have assisted us in locating missing materials and materials not owned. The state agricultural societies and extension offices have facilitated locating this material by allowing us to place notices in their newsletters explaining the project and requesting loans.

TABLE 1

SCHOLARLY RATINGS OF NEW YORK STATE AGRICULTURAL LITERATURE

	Range	% of Titles	No. of Titles
Monographs			
1	1.0–1.5	19	108
2	1.6–2.0	28	159
3	2.1–2.5	32	179
	2.6+	52	405
Serials			
1	1.0–1.5	2	17
2	1.6–2.0	12	91
3	2.1–2.5	34	265
	2.6+	21	119

CONCLUSION

The core-literature approach to preservation selection emphasizes the analysis, evaluation, and rating of a large body of literature prior to the physical treatment of titles. We have tested this approach at A.R. Mann Library as part of the New York State Agriculture and Rural Life Preservation Project. The most important benefit of this technique is that it will ensure the preservation of the most significant materials that document the history and development of agriculture in New York State—literature that is fundamental to any study of New York State's history.

The task of setting preservation priorities for a given literature is greatly simplified by first compiling authoritative lists of materials to preserve. For the New York State project, 1,348 titles were identified as potential candidates for preservation treatment. This figure represents the entire 2,890 citations in the bibliography minus pamphlet and theses citations and those titles already filmed or reprinted (a combined total of 1,542 citations). The majority of the theses on the list have already been filmed. We are investigating filming the balance of this material. We hope to obtain additional funding to preserve New York State pamphlet material as a separate preservation project. Of the 1,348 reviewed titles, 782 were serials. At an average of 11 volumes per serial title, the total number of volumes (monographs and serials) under consideration for preservation treatment is 9,168 volumes. We have sufficient funding to reformat only 2,289 volumes (or 25% of the total literature) over the course of the four-year project. The rated bibliography ensures that the most important materials will be reformatted first. These volumes, together with volumes already reformatted by commercial vendors and other libraries (344 titles, 2,014 volumes, 22% of the total literature), constitute 47%, or nearly half, of New York State's agricultural literature that is now reformatted (or will be at the conclusion of this project). In addition, priorities for preserving the remaining historical record that cannot be treated in this project have been established with the rated bibliography.

Setting preservation priorities for an entire discipline or subject area, even with a specific state-level focus, is labor intensive. However, it need be done only once, and the results will benefit all libraries with an interest in the literature of that discipline. One very thorough bibliographic and scholarly evaluation project can objectively and authoritatively set preservation priorities for an entire discipline. Prioritized lists, sorted by subject, period, or genre, can serve as the basis for defining specific preservation projects. Individual projects may be undertaken at various institutions but will contribute to a larger coordinated, cooperative preservation effort. By reformatting in a medium that allows for distribution of preservation copies to all participating libraries, a complete set of the preserved record may be housed in a number of libraries throughout the state. When viewed in this light, the time-consuming task of compiling and evaluating the bibliography is actually a cost-effective method of selection for preservation.

For this project the three authors, over the course of one year, collectively devoted about 0.5 FTE to compiling the bibliography, preparing for its distribution, and analyzing the results. Assuming a half-time pay rate of $15,000 per year plus $1,800 for the bibliographers' honoraria ($450 per reviewer), the total cost to produce the New York State bibliography was $16,800. At $1.38 per volume (12,130 total volumes in the bibliography, including unranked material, with an average of 11 volumes per serial title) or $1.83 per volume for only those titles reviewed (9,168 volumes), we believe this is a relatively small price to pay for such a thorough, well documented approach to preservation selection. This initial critical analysis of a large body of literature prior to preservation treatment ensures that the allocation of scare preservation dollars will be based on intelligent, justifiable priorities. An additional benefit of this project is that scholars will now have access to a comprehensive bibliography of 1820–1945 New York State agricultural publications—the first such work of its kind in this area of research.

A manual is currently in progress that will consist of a complete listing of the comprehensive bibliography that was compiled, a record of what was preserved and what remains to be preserved, and detailed instructions for conducting a similar bibliographic project. This primer will serve as a procedural guide for other states interested in systematically preserving the record of their state's agricultural history. Historians have suggested that this approach to setting preservation priorities might have application in other disciplines as well.

The New York State Agriculture and Rural Life Preservation Project has successfully involved scholars in a project to identify and preserve the most significant historical literature relating to New York State agriculture. This project is a first step in preserving the state-level agricultural literature of our nation. Using the methodologies developed at A.R. Mann Library, land-grant libraries and agricultural and historical institutions nationwide could proceed similarly to preserve systematically the agricultural literature of their state or region. Each state project would significantly contribute to the overall plan to preserve the historic agricultural literature of our nation.

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APPENDIX A

SUBJECT CATEGORIES

Citations Sent for Review	No. Citations
Monographs 1820–1945 (by subject)	
Agricultural Economics	83
Agricultural Engineering	16
Animal Science	29
Soils, Crops and Atmospheric Science	63
Forestry and Natural Resources	67
Food and Nutrition	35
Rural Life	107
Miscellaneous	166
Total monographs for review	566
Serials 1820–1945	
Serials about New York State agriculture	197
Serials published by the State of New York	114
Cornell publications and other State agricultural-related state institution publications	90
County publications	75
Published in New York, but not necessarily focusing on New York	306
Total serials for review	782

Citations Excluded From Review	No. Citations
Serials 1820–1945	
Pamphlets (less than 50 pages) not already preserved	826
Theses	494
Monographs already preserved (reformatted or reprinted)	80
Serials already preserved (reformatted or reprinted)	142
Total citations not reviewed	1,542

Book Reviews

Lawrence W. S. Auld, Editor

Cataloging Unpublished Nonprint Materials: A Manual of Suggestions, Comments, and Examples. By Verna Urbanski, with Bao Chu Chang and Bernard L. Karon; ed. Edward Swanson. Sponsored by OnLine Audiovisual Catalogers Cataloging Policy Committee. Lake Crystal, Minn.: Soldier Creek Pr., 1992. 129p. paper, $22.50 (ISBN 0-936996-61-7). LC 92-9470.

This manual is a welcome cataloging tool for libraries with general collections of print and nonprint materials. In the preface, Urbanski and coauthors Chang and Karon state that the "manual is not intended for archival or special collections" (p.v), in which case persons are referred to several existing archival cataloging manuals for guidance. Rather, the focus of this manual is the description of a broad range of unpublished nonprint materials through the application of the *Anglo-American Cataloguing Rules*, 2d ed., 1988 revision (*AACR2R*). The *AACR2R* rules that deal specifically with unpublished nonprint materials are examined, and many excellent suggestions are provided on how the rules for published nonprint materials can be applied to describing unpublished items.

There is no definition in *AACR2R* of what constitutes an unpublished work, and the manual does not provide one. Special guidelines provided by Ben Tucker (formerly of the Library of Congress) at the 1989 meeting of the OnLine Audiovisual Catalogers Cataloging Policy Committee are cited in the introduction. These consist of levels of distinction that can be used to facilitate the identification of an unpublished work. Although these are helpful, it is expected that catalogers will be required to exercise judgment, especially in cases where an item falls "between" the established levels. A particular bonus in the manual is the two-page list of "Things to Think About," which follows the introduction. In a series of questions and answers, the authors offer expert advice on all aspects of handling, cataloging, and caring for unpublished nonprint materials.

With the exception of the section on kits, the organization of the main text parallels the presentation of the rules in part 1 of *AACR2R*. The first section presents the general rules for descriptive cataloging in *AACR2R*, chapter 1, with discussion sections containing general observation about their applicability to unpublished nonprint items. Succeeding sections present the rules, discussion sections, and cataloging examples for sound recordings (chapter 6), motion pictures and video recordings (chapter 7), graphic materials (chapter 8), computer files (chapter 9), and three-dimensional artifacts and realia (chapter 10), concluding with a section on kits (rule 1.10). Pertinent Library of Congress rule interpretations are included in all sections. Where comments are unnecessary in the individual medium sections, catalogers are referred back to the discussion in the earlier sections.

The wealth of comments and suggestions throughout the text should enable catalogers to resolve most of the thorny problems associated with describing unpublished nonprint materials. The cataloging examples, forty in all, demonstrate that useful, standardized cataloging records can be produced, although there might be no identifiable chief source, and the information that is available might be incomplete or inaccurate. The authors' message to catalogers is to use common sense and to be creative and flexible!

All of the cataloging examples are in card-style format, which is curious considering that the manual is sponsored by the OnLine Audiovisual Catalogers. Access points are not covered, but they are identified in some of the examples. Classification and subject cataloging also are not covered. Two small blemishes surfaced in examining the text. First, the table of contents does not include the two-page list of "Things to Think About." Second, the third sentence in the discussion section on rule 7.7B4 (p. 38) appears somewhat scrambled. A bibliography for nonprint materials by Mary Konkel concludes the text.

This manual is a required tool for audiovisual catalogers working with general collections of all types and sizes. Collection development personnel in these libraries will also benefit by having this tool available for consultation. It is also a useful purchase for schools of library and information science that offer courses in nonprint cataloging.—*Ann M. Sandberg-Fox, cataloging consultant and trainer, Colchester, Vermont.*

Collection Assessment: A Look at the RLG Conspectus. Ed. Richard J. Wood and Katina Strauch. New York: Haworth, 1992. 192p. $32.95 (ISBN 1-56024-258-2). LC 92-4889. Also published as *The Acquisitions Librarian*, no. 7, 1992.

While the Research Libraries Group (RLG) Conspectus has not quite "revolutionized" collection development in this country, it is undeniably a major phenomenon and an innovative approach to collection assessment that has provoked widespread change as well as strong emotions. The conspectus has prompted us to scrutinize our local collections and to attempt to rework the concept of resource-sharing at the national level and beyond. Whether we will succeed in this endeavor is not yet known. We do know that, after more than ten years, the conspectus appears to be here to stay, in one form or another. It has been endorsed by the American Library Association, has spread to Canada through the North American Collections Inventory Project, and has been adopted by libraries in Europe and Australia.

This volume does not contain everything one would ever want to know about the conspectus, but it is a start. The book's focus is the RLG conspectus, and not collection assessment per se. It contains thirteen chapters, one of which is a partially annotated bibliography; a short introduction; and a conclusion. Contributors are primarily bibliographers and collection management administrators. The chapters move from the general, e.g., Jim Coleman's history of the conspectus and Joan Grant's analysis of the relevance of the conspectus to all aspects of collection management, to reports on specific models or experiments using this tool, such as Claire-Lise Benaud and Sever Bordeianu on the evaluation of the University of New Mexico's humanities collection and Dennis Stephens' description of Alaska's multitype library cooperative project based on the conspectus. Some, but not all, chapters begin with a summary. A standard approach would have improved the presentation, as would have a more careful editing of the text to eliminate typographical errors and misspellings.

While each author approaches the conspectus differently, highlighting particular characteristics of the tool or of its implementation, there is, nevertheless, considerable repetition. Nearly all define the conspectus, many of them describe the levels, and some of them identify the very same difficulties of working with the conspectus. Thus, they do not fit together well as complementary approaches into a cohesive whole.

The bibliography contains nearly everything ever written on the conspectus (although it is also in need of editing; e.g., instead of citing this author's SPEC Kit on the conspectus, Seay cites a *LRTS* review of it). It certainly will be a boon to library science students and historians who might want to understand what the conspectus was all about.

The most significant issues surrounding the conspectus emerge from a reading of this book. That the conspectus has raised our awareness of the need for a qualitative approach to collection assessment is clear, even if the debate continues.

The conspectus cannot be implemented without a strong commitment from the library administration, allowing time for bibliographer training and for the complex assessment process. Several authors cite the important link between the conspectus and the development of collection policy statements (also subjective descriptions of collection development efforts) and emphasize the value to bibliographers of the conspectus exercise. According to Coffey, "Doing the work to arrive at the conspectus descriptors is an informative and valuable effort for anyone whose job it is to acquire materials for a collection and who wants to be good at it" (p.66).

There are political issues as well. What if faculty believe that the collection is a "research" collection and the bibliographer believes that it is possible only to build to support level 3, or an instructional collection? How can the conspectus be used to leverage additional funding for library materials? One issue that has been shadowing the conspectus for years and that has implications for resource-sharing is the interpretation of the levels. How can we be sure that one person's rating of level 4 is the same as another's? In other words, if my institution is going to rely on your institution to collect at a research level in a given field, can I trust you to do a good job? Is there such a thing as an absolute level 4? Or do bibliographers collect differently but still at a research level?

The original goal of the conspectus methodology was to design a means by which libraries could engage seriously in cooperative collection building. In order to do so, collection development librarians needed a lingua franca, a common way to describe their collections to one another. Though the debate continues over the interpretation of levels, the usefulness of verification studies, and how to make national-level cooperation work, there is no doubt that the conspectus is a useful tool that has influenced the field of collection development, sometimes in unanticipated ways. This volume (previously published as a special journal issue), discusses many of the uses of the conspectus and raises most of the significant questions.—*Deborah Jakubs, Duke University.*

Collection Management for the 1990s. Ed. Joseph J. Branin. ALCTS Papers on Library Technical Services and Collections, no. 3. Chicago: American Library Assn., 1993. 178p. paper $25; ALA member, $22.50 (ISBN 0-8289-0595-1). LC 92-25859.

This slim volume includes the text of fourteen papers presented at a 1989 institute. Yes, 1989! As described by Branin in his introduction, this institute was the tenth in a series that began in 1981 at Stanford University. Branin remembers these various institutes fondly, recalling events from previous programs. Nowhere does he give any information as to whether any of the previous proceedings or papers were published. Nor does he describe how programs developed and changed from that first one in 1981.

Here are papers in unchanged form from a meeting held four years prior to publication date. They are handsomely presented on the page and they read well. It's as though you were looking at a perfectly formed fly, trapped in amber, or as though you had stumbled upon an ancient tomb with all of the bodies and artifacts still in place. It's eerie. In this age of e-mail and electronic publications, activities sponsored and fostered by the American Library Association and the Association for Library Collections & Technical Services, one wonders at such a dated publication being issued with no words of explanation or apology. One can only visualize the many committees and bureaucratic approvals needed before this publication could be released.

The sole updates are a listing of contributors at the beginning of the volume indicating that four of the twelve authors now hold different positions, and on page 90 a bracketed note informs us that the latest edition of the *National Shelflist Count* was published in 1990. But no references are updated. For example, one short paragraph on page 99 is devoted to the OCLC/AMIGOS Collection Analysis CD, but that paper's bibliography includes no references to the many writing about this service since that time. Branin states that this institute was to emphasize trends and issues for the 1990s, and he notes that restricted budgets, technology, and resource sharing were dominant subjects.

The volume begins with four major papers: Beverly P. Lynch describes the library's collections from the viewpoint of the director and presents clear guidelines for collection policies. She maintains, "For the university library, the collection remains primary" (p. 12). The "virtual library" was not for her, at least not in 1989. The examples used by the principal speakers are taken from their own experiences. In Lynch's case, she speaks of programs at the University of Illinois at Chicago. Robert M. Hayes follows here with a summary of a study he was undertaking at the University of California, Los Angeles, on strategic planning for library and information resource management. John Howe, a historian then serving as interim university librarian at the University of Minnesota, looks at academic libraries and their competition for funding with other campus units. He admits that there has occurred a "decentering of the library" as new technologies provide alternate forms of access to scholarly information. He suggests some strategies to reassert the centrality of the library. The fourth paper, by Nancy P. Sanders, is more specific, focusing on automated techniques for collection management and efforts then underway at Ohio State University.

The remaining eight papers are much shorter presentations from panel discussions and summaries of workshop discussions. These papers include much practical and useful information (if you keep in mind the 1989 date). Bonnie MacEwan outlines various means for collection assessment and evaluation, followed by a reasonably lengthy bibliography. Eugene L. Wiemers, Jr., gives no-nonsense advice on budget management. Robert Mareck follows with guidelines for selecting items for preservation, spelling out pros and cons of the several preservation options. Ann Thompson, Ray Boylan, and Doris R. Brown discuss cooperative programs (Boylan emphasizing the Center for Research Libraries and Brown looking at programs in Illinois). Joseph J. Branin adds a brief paper on the importance of intellectual freedom in collection management. The final two papers, by Dana C. Rooks and Marcia Pankake, are designed to give encouragement and inspiration to institute participants as they return to their home institutions.

If you liked 1989, you'll certainly find many happy memories in this book. But let's move on.—*Richard D. Johnson, State University of New York, College at Oneonta.*

A Hybrid Systems Approach to Preservation of Printed Materials. By Don Willis. Washington, D.C.: Commission on Preservation and Access (1400 16th Street, NW, Suite 740, 20036-2177): 1992, 45+p. $10 prepaid.

This is one of a series of publications of the Commission on Preservation and Access describing, evaluating, and otherwise considering the roles of differing technologies in the ongoing efforts to preserve the intellectual content of deteriorating library and archival materials, to develop improved modes of access, and eventually, to form the virtual library. Currently, as the preservation microfilming effort has gained momentum, there has been considerable interest in and comment upon the use of newer technology, in particular digital storage based upon electronic scanning of documents, in place of or alongside the older and better known microfilming.

In this publication, Don Willis discusses the strengths and weaknesses of both microfilm and digital storage and makes a case for a system that would combine the two, capitalizing on the strengths and diminishing, if not obviating, the weaknesses of both. In a relatively short text of twenty-nine pages, the paper moves from introduction, executive summary, and recommendation into a tightly written and closely reasoned consideration of the advantages and disadvantages of micrographics and digital imagery; the optical disc as a storage medium with long-term but not true "archival" capability, as archival has been understood by preservationists; the role of resolution in both media; a comparison of the two media (i.e., the tradeoffs in selecting one or the other); benefits to be realized by utilizing both for their strong points and for the obviation of their weaknesses; a survey of the operation of such a system; the costs of both micrographic and digital systems; a general conclusion; and recommendations.

The text is supplemented by a series of appendixes dealing with resolution of both the micrographic image and the digital image; a summary of storage possibilities (film, magnetic discs, magnetic tapes, optical discs, CD-ROM, etc.); costs of media; costs per page for preserving data using different media; a summary of standards and handbooks presently applying to the two media; the endnotes to the text, which essentially form the bibliography for the paper; and a collection of nineteen figures or illustrations referred to throughout both the paper and the appendixes.

This paper has two major strengths. One is the stated purpose of the publication: the comparison of and combination of micrographics (microfilm) and digitizing (scanning) techniques. Willis' thesis is that combining the two, at least in the relatively near future, can utilize both to advantage. Microfilm, both that already made and film to be made in the future with certain intelligent features to improve accessibility, can provide a truly archival storage base for large bodies of preserved material, much of which might have relatively low levels of use. When needed, such material might efficiently and economically be scanned, then used online and stored electronically for as long as use justifies such storage before being replaced by materials in greater demand. The archival base is not lost when the item drops from the electronic realm, because the film remains and might be scanned anew should the item again be called into active use. Such a system would take advantage of the archival qualities and economy of microfilm storage and the ease of access and use provided by the digital medium that is, for the present and near future at least, more costly than film. Willis' case for a system of this sort is one that needs to be understood and that deserves consideration as librarians, archivists, and others continue to develop programs to preserve and to foster access to deteriorated and threatened materials.

The second strength of this paper is the attention given to resolution of the stored image. This is central and critical, for any system for preserving graphic materials must be capable of capturing, maintaining, and reproducing the image with clarity and fidelity to the original. The explanations of resolution, both that of the photographic image on microfilm and that of the electronic image in a digital system, are clearly written and most useful for those of us not expert in the graphic arts, photography, or electronic imaging. Willis' demystification of these and related matters makes this paper a major contribution in the ongoing development of systems to preserve and provide access to materials of many types in all fields of scholarship.

This paper is "must" reading for practicing librarians, archivists, students, administrators, and all who are or who will be engaged in the ongoing design of the archival and library structures of the future.—*William T. Henderson, University of Illinois at Urbana-Champaign.*

Introduction to Cataloging and Classification, with 45 exhibits and 15 figures. 6th ed. By Mildred Harlow Downing and David H. Downing. Jefferson, N.C.: McFarland, 1992. 316p. $31.50 (ISBN 0-89950-720-4). LC 92-51210.

I like the intent of this text. Beginning cataloging students easily get consumed by the nitty-gritty details of "how to" catalog. Students have a much harder time stepping back and reflecting upon the purposes of bibliographic control. This book attempts to assist students in this reflection.

The text is promoted as an introduction for students new to the field. The authors have aimed at providing a complete introduction to cataloging and classification by providing "numerous discussions of practical issues." They have attempted "to chronicle the changes" in the field of cataloging and classification and, also, to give a clear picture of what has not changed: "We have attempted to explain why the computer makes competence on the part of the human cataloger more, rather than less important. . . . Although this is an introductory textbook, we have provided a more detailed discussion of some of the advanced problems in the field" (p.xviii)

These are ambitious goals. In 316 pages it is not possible to provide an overview, with detailed guidance on the fundamental aspects of cataloging and classification, and detailed discussion of some of the advanced problems in the field. Consequently, the authors only partially accomplish their goals. There are a number of excellent overview sections. For example, the authors' emphasis on the user and retrieval in the introductory chapter is important. They continue this theme by emphasizing the relationship between description and retrieval and access points and retrieval in the basic chapter on bibliographic description. Many of the passages are well written and would be understood easily by a student new to the field. The authors provide a good definition and explanation of publishers' series together with a clear presentation of analytics and when to use name-title added entries and when to use separate analytics. The issues of analyzing the subject content of an item and of providing subject control are well presented. The provision of discussion questions to help the student reflect upon the readings is useful. The appendixes for how a computer stores and sorts information will help students reflect on the effect of cataloging and catalog design on the users' ability to retrieve information.

However, there are also difficulties. At times the authors have lost their focus as an introductory text. It will be confusing for a neophyte to have standard numbers introduced in one paragraph, then a discussion of the International Standard Bibliographic Description (ISBD) for most of a page, and then return to a discussion of International Standard Book Numbers (ISBNs). Students struggle with acronyms, and these two in particular seem to be difficult to sort out. Some of the issues of corporate authorship, serials, and uniform titles presented in the chapter "Advanced Problems" would be better reserved for a more advanced text where adequate space could be allotted for their development. There are also places where the text is misleading or inaccurate. *Books in Print* is not a reliable source for determining how an author uses his or her name. The terms *subject heading list* and *thesaurus* are used as though they are interchangeable. It was the eleventh printed edition of *Library of Congress Subject Headings*, not the twelfth, that first used the terms *BT, RT,* and *NT* (*broader term, related term,* and *narrower term*). Because of these and other difficulties, this text cannot be recommended. That is unfortunate because there is much about the authors' approach that is exciting.—*Tschera H. Connell, Columbus Program, School of Library and Information Science, Kent State University.*

Making Sense of Journals in the Life Sciences: From Specialty Origins to Contemporary Assortment. By Tony Stankus. Monographic supplement no. 8 to *The Serials Librarian.* New York: Haworth, 1992. 278p. $39.95 (ISBN 1-56024-181-0). LC 92-4085.

Making Sense of Journals in the Physical Sciences: From Specialty Origins to Contemporary Assortment. By Tony Stankus. Monographic supplement no. 7 to *The Serials Librarian.* New York: Haworth, 1992. 239p. $34.95 (ISBN 1-56024-180-2). LC 92-4092.

The challenge and problems that escalating serials prices, far exceeding the general inflation rate or increases in library budgets, present to librarians is so well-known that there is no need to elaborate them here. These two companion-piece monographs are intended to help "working librarians" (their intended audience, according to the introductions, which are identical in both volumes) get a handle on scientific journals. The author, Tony Stankus, has good credentials for writing these works, having served as Science Librarian at Holy Cross College Library for seventeen years and becoming one of the nation's more prolific writers on scientific journals.

The Physical Sciences volume contains chapters devoted to analytical chemistry, inorganic chemistry, organic chemistry, physical chemistry, physics, and applied physics. The Life Sciences volume is organized into three broad chapters covering (1) molecular and cellular biology, genetics, immunology, and biochemistry; (2) physiology and neurosciences; and (3) evolution, ecology, ethology, and the environment.

Each chapter follows essentially the same format. The chapters are divided into two parts termed "background" and "sorting out the journals." The "background" section covers the subfield's history with considerable emphasis on scientific biography to illustrate the area's origin and historical development. While not comprehensive, these historical sketches often date to the nineteenth century and sometimes to classical antiquity.

The next section of each chapter discusses the journals themselves and is subdivided by specialty area; e.g., analytical chemistry is divided into general analytical chemistry, spectroscopy, chromatography, other analytical techniques, agriculture and food processing, industrial chemistry, and finally, medical, pharmaceutical and forensic sciences. This organizational scheme evidently represents the "contemporary assortment" promised in the title.

Each subsection provides a discussion of the specialty's leading journals, which often are compared with each other. Sometimes Stankus rank orders his first, second, and third choices. Factors such as the publisher, place of publication, price, language, and the authors' national origin occasionally are mentioned.

A major feature of these subsections is a series of bar charts illustrating data for many, but not all, of the discussed journals. Six data points are presented. Three of these—(1) the percentage of papers from U.S. authors; (2) the percentage of papers originating from "major powers," defined as Western Europe, Canada, and Japan; and (3) the relative impact factor—are stated to be "what makes a . . . journal attractive to a scientist." Three other statistics—(1) the number of papers published, (2) the number of library subscribers, and (3) cost—are considered to make a journal attractive to a librarian. This categorization of evaluative criteria seems rather arbitrary, as it is questionable whether scientists understand and attach importance to impact factor any more than do librarians.

Many positive things can be said about these two volumes. A vast array of knowledge concerning scientific history and biography is synthesized. The author has a wealth of practical experience that lends authority to his subjective judgments. According to the indexes at the beginning of each volume, nearly 1,100 journals are mentioned in these two works. The books, especially the background sections, are written in a lively, entertaining style with humor frequently introduced into the narrative. For instance, Stankus recounts a story about a scientist whose research required him to take rectal temperature readings on hibernating bears—and one time the bear woke up! (This anecdote is apparently legendary among scientists.)

The use of the Institute for Scientific Information's "impact factor" (available in the *Science Citation Index* and the *Social Sciences Citation Index's Journal Citation Reports*) is fairly sophisticated. Parenthetically, it should be explained that a journal's impact factor represents the ratio between the number of citations received and the number of citable items published in the journal. Basically, it is the number of times a journal's so-called "average article" has been cited. This citation measure compensates for the advantage that older, larger, and more frequently issued journals would enjoy if evaluation were based strictly on total citations received. Instead of using raw impact factors, Stankus developed a "relative impact factor." Starting with a base of 100 for the highest impact factor among "closely comparable specialty journals," this measure normalizes the impact factors for all journals in the specialty using a 1-to-100 scale. Although not stated by the author, his approach compensates for the fact that experts consider it methodologically dubious to compare journals from different disciplines or specialty areas with raw impact factors (due to differing citation patterns). However, it would have been helpful if he explicitly indicated the specific source year or years for the data as a journal's impact factor can vary from year to year.

Unfortunately, these volumes do not live up to the full potential offered by their subject matter. Several criticisms should be mentioned.

The factual assertions are not always accurate. For instance, on page 177 of the Life Sciences volume, Stankus states the famous hominid fossil "Lucy" was discovered by Mary and Louis Leakey. In actuality, Lucy was discovered by Donald Johanson.

The author used "display holdings" statement counts from the OCLC Online Computer Library Center's Online Union Catalog to determine the number of libraries subscribing to a journal. As partially admitted by Stankus, the accuracy of this approach is questionable because not all libraries use OCLC, those that use OCLC do not always catalog their serials, and the presence of a library's symbol in a serial record does not necessarily indicate a current subscription.

These volumes fail to capture the full complexity of journal evaluation and management. Important evaluative criteria, such as indexing, are ignored. Stankus places great emphasis on the percentage of papers originating from a particular country, but the overall stature of a journal's authors is undoubtedly more significant (although admittedly more difficult to measure). Moreover, Stankus tends to evaluate journals in an absolute sense, rather than considering their value for a particular use (e.g., research versus teaching) or type of library. The journals discussed here could be used in college, university, medical, or special libraries, but only occasionally is a journal recommended for a specific type of library. Stankus could take a lesson from Katz and Katz, perhaps the premier journal evaluation tool for practicing librarians, which devotes considerably more attention to the match between a specific journal and the type of library for which it is appropriate.

The scientific history and biography component does not meet rigorous research requirements because it is based on a limited number of sources, many of which are standard reference works. For example, *Asimov's Biographical Encyclopedia of Science and Technology* and the *McGraw-Hill Encyclopedia of Science and Technology* are among the entries in the short, seventeen-item bibliography (which is identical in both volumes). However, Stankus also mentions his extensive experience in a science library, faculty anecdotes, obituaries of scientists, and public television as additional sources. It is unfortunate that both volumes contain only five identical footnotes following the introduction (with only one note citing a source), as this reviewer frequently found himself pondering the source for various tidbits of interesting information. To be fair to the author, he probably did not intend these volumes to be rigorous research works.

Serials have not received the full attention they deserve in the literature of collection development. Consequently, any attempt to address serials collection management is welcome. Yet, one wonders how much value these volumes will offer to their intended audience of "working librarians." The background sections might be useful to novice science bibliographers seeking introductory surveys concerning their fields of responsibility. The information contained in the journal analysis sections can certainly be used in serials management decisions, but by themselves, these volumes will probably not be sufficient to provide science librarians a handle on their disciplines' journals.—*Thomas E. Nisonger, Indiana University, Bloomington.*

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Organizing Knowledge: An Introduction to Information Retrieval. By Jennifer Rowley. 2d ed. Aldershot, Hants, England; Brookfield, Vt.: Ashgate, 1992. 510p. $55.95; paper $22.95 (ISBN 1-85742-004-7; paper 1-85742-005-5). LC 92-5186.

Beginning with the premise that the "organization of knowledge is an essential preliminary to the effective exploitation of that knowledge" (p.3), Rowley covers the entire range of information organization and retrieval in a comprehensive and readable work. This second edition incorporates recent developments in information retrieval, such as international telecommunications networks and optical disk storage, and concludes with a framework for further study and innovation.

The organization proceeds from the basic elements of information records to systems for handling them and providing access for exploitation. There are 26 chapters, arranged in five parts: Records, Authors and Titles, Subjects, Systems, and Generalia. Each chapter is clearly organized, with specific examples and illustrative figures provided for each topic discussed. The text is self-referenced, directing the reader to additional discussions of a topic in a later or earlier chapter. Each chapter concludes with a lengthy list of Recommended Readings.

Part 1, Records, describes principles of document description, both in indexes and library catalogs. The similarities and differences of printed and computerized indexes and catalogs are explored and clarified. In Part 2, Rowley identifies theoretical issues underlying name indexing and shows how various cataloging codes have addressed these problems. Here is found a good summary of the development of cataloging codes.

Rowley clearly addresses the problems of the subject approach to information, with clear explanations of common bibliographic classification schemes in Part 3. The alphabetical subject approach is well covered, with descriptions of library subject heading lists as well as computer-based systems, such as PRECIS and chain indexing, liberally illustrated.

Part 4, Systems, describes both external and in-house online information retrieval systems, including both optical disks and networks. A treatment of issues affecting the whole field of information organization and retrieval makes up Part 5, Generalia. Filing order for headings, and systems for arrangement of the documents themselves are discussed. Rowley also identifies major research initiatives, such as the Okapi and Hypercatalog projects.

To choose to organize knowledge is ambitious, and Rowley has accomplished this ambition in 500 pages. Rowley's strength is her clear explanation of theoretical issues underlying the practice of information organization and retrieval. This theoretical framework provides grounds for the title's claim of organizing "knowledge"—as contrasted to the lower-order "information" or "data."

Other authors working in this literature go into more detail in individual areas such as cataloging or automation of information storage and retrieval. A similar but less comprehensive work is Taylor (Wynar 1992). Taylor provides significantly more information on details of cataloging but much less on the theory underlying cataloging practice. Saffady (1989) gives fuller information about the computer processes used to organize information in libraries, while Buckland (1991) has a different focus, even more theoretical than Rowley's work, with much less discussion of traditional library cataloging.

Organizing Knowledge would be an excellent addition to any academic library that supports programs in information management or library and information science. It would be appropriate for use as a primary textbook in information science survey courses and as an auxiliary text in cataloging, classification, and online searching courses. Public and high school libraries will also find this a useful basic title for the study of information retrieval.

Readers and students in North America might find the British style less friendly than that in American textbooks, but this caveat is balanced by the inclusion of British and European information that might otherwise be difficult to access. A glossary of basic terms and a useful index are also included. Some technical information is already outdated, for example, the statement that modems will "move towards 9600 baud in the near future" (p. 336). The presentation of information on the page is clear, and typography distinguishes examples from discussion. The sewn binding with paper cover is sturdy and allows the book to lie open. This work is highly recommended.—*Ellen Crosby, University of South Carolina.*

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Retrospective Conversion: History, Approaches, Considerations. Ed. Brian Schottlaender. New York: Haworth, 1992. 167p. $24.95 (ISBN 1-56024-328-7). LC 92-19493. Also published as *Cataloging & Classification Quarterly,* vol. 14, nos. 3/4, 1992.

This relatively small tome contains a tremendous amount of information with regard to the entire retrospective conversion ("recon") process. The book is divided into three sections: History, Approaches, and Coordination and Innovation, and begins with the general, moves to the specific, and then returns to the general again.

In the first chapter Daphne Hsueh reviews the recon literature of 1980–1990 that aptly describes the love-hate responses experienced by technical services librarians toward retrospective conversion. She notes the lack of articles on sampling, standards, and the estimation of costs. There is also a dearth of articles dealing with the conversion of serials, government documents, maps, analytics, and monographic series. On the other hand, there is no lack of articles on "How we do it at our library."

Susan Vita describes the Library of Congress' conversion of pre-1968 records. "PREMARC," as the project was dubbed, attempted to assign machine-readable coding to these old records automatically. The problems that developed with the format recognition program and the cleanup that followed would discourage any stalwart soul. However, it must be noted that it was "the first step in making these additional five million records from the Library's catalog available for research" (p. 27).

The description of the recon of a medium-size academic library, the University of Idaho, is addressed by Mary Bolin and Harley Wright. Early attempts found the use of various approaches such as in-house conversion, the use of a vendor, and even a combination of the two. This necessitated several passes through the shelflist, which resulted in phases fondly referred to as "final recon" and "ultimate recon."

Ruth Christ and Selina Lin discuss the serials conversion project undertaken by The University of Iowa Libraries in preparation for the implementation of a NOTIS online system. A list of twelve "Project Design Considerations" forms a solid basis for questions to be addressed before taking on a recon project. As work on the conversion progressed, serials were divided into three levels of difficulty, which came to be known as "the good, the bad, and the ugly." This offering proved that a sense of humor is a definite necessity for personnel involved with any recon endeavor.

In the section titled Coordination and Innovation, Michelle Koth and Laura Gayle Green review the complexities of converting bibliographic records for music scores and the uniform titles and subject headings that make them an especially challenging venture. The authors were part of the Associated Music Libraries Group sponsored recon grant team. Seven music libraries conducted recon projects, and the workflow, staffing levels, and perceived advantages and disadvantages of each participant provide most valuable information.

Beth Sandore describes a unique conversion undertaken at the University of Illinois at Urbana-Champaign. A PC workstation interface was developed to facilitate processing of shelflist information. This was used for both the local online catalog and for copy cataloging. Also discussed was the shelflist sampling, which proved to be time-consuming and not always accurate but nevertheless was useful as a general guideline in estimating cost.

In "Editing Recon Records," Edward Adrian Lentz discusses when enough editing is enough, by reviewing the literature on the topic. Consistency and following standards are of the utmost importance, and Lentz quotes Lightall, who wisely states, "It is almost more important to be consistent than to be right" (p. 130). However, as Juneja is quoted as warning, the "card catalog was never a perfect catalog" (p. 130), so we should be as tolerant of a machine catalog as we were of its predecessor.

In the final chapter, James Maccaferri discusses managing authority control from the perspective of a recon project. The need for authority control because of the literalness of computer filing and searching, and both subject and name authority checking are equally important. The authority control project at the University of California, Los Angeles, for the creation of its ORION online system, is outlined. However, regardless of whether such a project is done in-house or by a vendor, "perfect authority control is elusive" (p. 163).

This rather small volume delivers a great deal of information for anyone contemplating a retrospective conversion project. However, if you are watching your budget, remember that this monograph is published simultaneously as *Cataloging & Classification Quarterly*, volume 14, numbers 3/4. This will leave you an additional $24.95 in your budget to spend on a different title not already duplicated in another form.—*Elaine K. Rast, Northern Illinois University.*

Vendor Evaluation and Acquisitions Budgets. Ed. Sul H. Lee. New York: Haworth, 1992. 130p. $24.95 (ISBN 1-56024-253-1). LC 92-10146. Also published as *Journal of Library Administration*, vol. 16, no. 3, 1992.

If we are honest with ourselves, many of us find it hard these days actually to read our professional literature. In addition to the regular printed literature, we are inundated with e-mail and electronic bulletin boards, with work memos and publishers' advertisements, with junk mail and—occasionally—an actual letter from a colleague. We have all become, whether we like it or not, proponents of the Evelyn Wood approach to reading. Combine this with the ennui or smugness that some of us will admit to after a number of years in the profession, and it is surprising that librarians do any reading at all.

A refreshing antidote to this malady can be found in the newest Sul Lee addition to acquisitions and collection management literature, *Vendor Evaluation and Acquisitions Budgets*. Just when you thought you had read (or scanned) every conference proceeding you ever wished to read, Lee produces an engaging volume that provides new information about acquisitions and budgets. This is not surprising when one considers the heavy-hitters Lee has assembled here: Ann Okerson, Joe Barker, Chuck Hamaker, and Fred Lynden are among an impressive array of speakers. The sixth such conference from the University of Oklahoma, these proceedings are a welcome addition to the literature of acquisitions and collection development.

Okerson sets the context and tone with an excellent distillation of the issues and trends in publishing and budgets. This is a fine review of the efforts that libraries have made in the past several years to deal with budget and publishing cost crises. Her piece alone is worth the price of admission. Noting that "our role is to manage a serious but not unfriendly business" (p.40), Barker lends the Berkeley experience and his own brand of creativity to a discussion of library-vendor relations. Bob Houbeck takes a philosophical bent with a view of research and development and the role of research libraries, and looks at how new technologies and difficult funding situations are placing our collections and our mission in jeopardy. Hamaker, asking the tough questions as usual, challenges the notion of "more is better." Other chapters give a state-of-the-art review on vendor relations (Richards), detailed strategies for budgeting (Lynden), and vendor perspectives from Kathleen Born and Dana Alessi.

It was a pleasure to find a volume that so easily engages one in the seemingly lost art of reading. More surprising is the discovery of this in a conference proceeding. It is likely that the chapters here will not receive the wide dissemination they deserve. Lee has done a fine job of editing, preserving the taste of the conference and the presenters. If you are interested in the topic and want to indulge in some good professional reading, this is one place to start. It is recommended for librarians and students alike.—*Karen Schmidt, University of Illinois at Urbana-Champaign.*

Networks, Open Access, and Virtual Libraries: Implications for the Research Library. Ed. by Brett Sutton and Charles H. Davis. Clinic on Library Applications of Data Processing, 1991. Urbana, Ill.: Graduate School of Library and Information Science, Univ. of Illinois at Urbana-Champaign, 1992. 153p. $20, plus $3 for shipping (ISBN 0-87845-087-4; ISSN 0069-4789).

Virtual library, logical library, electronic library, distributed digital library, and *library without walls* are terms that say something about the efforts and aspirations of contemporary information technologists and librarians. This 153-page book collects twelve articles written by academic library directors, system developers and administrators, members of the scientific computing community, library consultants, and university administrators. The writers, who address a wide range of issues in computer networking and its application in research libraries, examine this rapidly expanding field from diverse perspectives and present a realistic picture of the adaptive processes that are taking place at the intersection of the research library and advanced computer networking. The articles collected here are papers presented at the Twenty-Eighth Annual Clinic on Library Applications of Data Processing, held April 7–9, 1991, sponsored by the Graduate School of Library and Information Science, University of Illinois at Urbana-Champaign, and the Committee on Institutional Cooperation.

Clifford Lynch charts today's revolution about information: who will control it, who will supply it, and who will have access to it. He also discusses the possible roles of research, special, and public libraries and library schools in the future world of electronic computer networks.

Paul Evan Peters discusses what is meant by *networked information resources and services,* providing a practical appreciation for what currently constitutes these relatively new information resources and services and how they will likely evolve in the 1990s.

Susan K. Martin talks about the legislation currently under consideration, how the *E* (which stands for *Education*) got into *NREN*, what NREN is, who will have access to it, what will be accessible on the network, network access costs, who will pay for it, and what librarians should do in the implementation process. This is a must-read chapter for anyone interested in NREN (the National Research and Education Network).

James E. Rush outlines a program at PALINET, currently at the conceptual stage of planning, that will enable its members to deliver fee-based services to business and industry through existing regional telecommunication networks and the proposed NREN. He argues that "libraries have the opportunity to serve business and industry on a profitable basis and should pursue this opportunity before it is seized by other organizations" (p. 81).

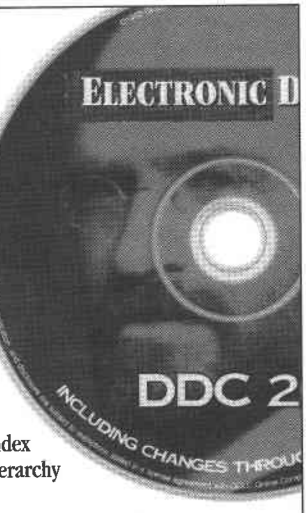
Charles E. Catlett and Jeffrey A. Terstriep provide an excellent review of the growth of the Internet and its current information archive services. They also propose methods for providing interactive access to multimedia data. Various information types and their access modes are discussed in terms of their role in defining advanced digital library and network services. A prototype digital library system and user interface, developed at the National Center for Supercomputing Applications, is examined. This paper is readable and successfully conveys technical information to general readers.

M. E. L. Jacob summarizes a panel discussion, with Steve Cisler, Clifford A. Lynch, Ward Shaw, and Bernard G. Sloan, which she chaired. Briefly discussed are how and why people communicate and public rights versus property rights.

Martin Runkle discusses, from the library administrator viewpoint, the economic and funding problems raised by the involvement of academic libraries in networks. He suggests that, given the development of electronic information technology and libraries' limited financial resources, librarians have to determine priorities, scrutinize budgets, and consider alternatives for reallocating money.

Kenneth R. R. Gros addresses certain issues created by library networking, namely governance, budgeting, cooperation, and reporting lines. Thomas W. Shaughnessy discusses issues of ownership versus access, the responsibility for local collection development, and costs of interlibrary loan. William J. Studer alerts librarians that, with the development of electronic networks, libraries will be faced with double costs associated with the storage of dual formats. Additional costs will result from having to inform and train potential users. Carl R. Grant discusses how networks will affect the so-called traditional bibliographic services.

The collection of articles here, led by an excellent introduction by Brett Sutton, examines networks, open access, and virtual libraries from different angles. The writing will hold readers from cover to cover. The presentation of details on this subject makes it an important contribution to professional literature. I recommend this book for anyone who is interested in learning library directions now and in the immediate future.—*Judy Jeng, Rutgers University, Newark, New Jersey, campus.*



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Letters

From Glen A. Zimmerman, Acting Chief, Cataloging Policy and Support Office:

I read with interest the article "Are We on Equal Terms Yet? Subject Headings Concerning Women in LCSH, 1975–1991" by Margaret N. Rogers in your April 1993 issue, in which the author speaks favorably of changes that have been made in the treatment of women in LCSH in the last decade and a half. Readers of Library Resources & Technical Services may be interested to know of another significant change that the Library of Congress Cataloging Policy and Support Office completed recently. Headings designating the wives of professional or occupational groups have been converted from the form [...] 's wives to the more inclusive and non-gender-specific form [...] 's spouses.

These changes will appear in the 17th edition of LCSH, scheduled for publication in 1994.

From Carolyn O. Frost, Associate Dean and Professor, School of Information & Library Studies, University of Michigan:

The review of Arlene Taylor's eighth edition of Introduction to Cataloging and Classification (LRTS Jan. 1993, pp. 107–8) suggests some strengths of the edition but takes issue with the extent of material included on the Anglo-American Cataloguing Rules (AACR2). I would like to present an alternative opinion, as well as suggest some additional strengths of the new edition.

A significant criticism leveled at the book is that almost half of it is focused on the 1988 revision of AACR2. While some might argue that this bibliographic standard has received disproportionate balance, it might also be said that AACR2, with all its shortcomings, embodies our most exhaustive and ongoing attempt to codify bibliographic practice. There is a strong case to be made for incorporating AACR2 into classroom instruction for beginning students, and this includes students in all areas of the profession, not just catalogers-to-be. It can be argued that organization and access are at the core of what we do as a profession, and standards such as AACR2 deserve careful examination as prospective, although not necessarily inevitable, models for nontraditional as well as traditional environments and applications. In grappling with the teaching of this standard, I have found that self-instruction in this regard, as suggested by the reviewer, can be immensely frustrating. My twenty years of teaching experience in this area argue strongly against Thomas' assumption that AACR2 is "suitable for private study." While "logically structured," it is in many ways as intellectually inaccessible as a legal code. For those who expect students to have a working familiarity with this basic tool, a selection of rules, LC interpretations, and examples remains immensely helpful. In particular, if AACR2 itself is not to be used as a required text, a textbook containing a substantive selection of excerpts is invaluable.

The reviewer notes the reflection of new editions in standards such as DDC, LCC, LCSH, Sears, and AACR2. It should be added that Taylor's chapters on LCSH and DDC not only reflect new material, but also evidence a fresh approach in terms of their organization and articulation. The first chapter provides a framework for bibliographic control and then places into that framework a discussion of catalogs and the cataloging process. In the chapter on subject arrangement of library materials there is a new discussion of the process of determining what an item is about. In the section on LCSH, there is a representation of LC authority records for subject headings, which is useful in introducing the concept of authority control procedures in the context of subject headings.

The criticism that the book failed to include Bliss' Bibliographic Classification in the bibliography overlooks the fact that Bliss does appear in the notes, which list extensively the completed volumes of the second edition of Bliss. It should also be mentioned that, in this regard, Bliss received treatment consistent with schemes such as UDC, Colon, NLM, and INSPECT.

Taylor's newest edition continues to offer a solid underpinning for the study of the bibliographic standards which have formed the foundation of bibliographic organization and access and which merit consideration in the development of new models for a changing information environment.

From John D. Byrum, Jr., Library of Congress:

I must note that the report in LRTS 37(3), page 284, of my retirement from service at the library of Congress is premature—in fact, very premature. Although I may have momentarily disappeared on paper when the positions I formerly occupied as chief of the Descriptive Cataloging Division and acting chief of the Subject Cataloging Division were abolished in consequence of the Cataloging Directorate reorganization in June 1992, I have resurfaced as chief of the Regional & Cooperative Cataloging Division and may be reached at LM535, Library of Congress, Washington, D.C. 20540.

Reply from Richard P. Smiraglia, editor:

I am truly embarrassed and I most sincerely apologize.

Despite all of our safeguards, nobody caught the error. Thank goodness we aren't in charge of national security.

I hope this hasn't caused you any difficulty.

Once again, my apologies.

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Volume 37, 1993

Compiled by Edward Swanson

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b. Titles—of articles and of articles about which letters were published
c. Subjects—of articles and of books reviewed

Subject entries for individuals are identified by "(*about*)"; letters are identified by "(*c*)".

Reviews are indexed by name of reviewer and by subject of the work reviewed, identified by "(*r*)." They are also listed by title under the heading "Books reviewed."

Entries are arranged word by word following the "file-as-spelled" principle. Numbers are arranged before alphabetical characters; acronyms without internal punctuation are arranged as words.

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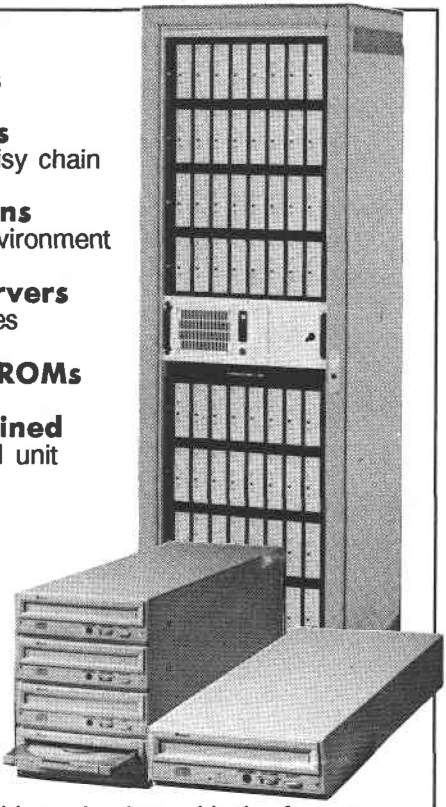

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